GUIDING THE GRAND:
JOURNEYING INTO THE GRAND RIVER'S DIVERSE HISTORIES

by

Carly Lynn Kandrack

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

The Grand River is a dynamic force that acts on and within the landscape of its watershed. Through the course of an eleven-thousand-year relationship with humanity, its identity has evolved most dramatically in the last two hundred years. Human understanding of the river has gone from prosperity during early settlement, to adaptation under pressures of increasing mid-century flooding and drought, and now, toward a passive stance that views the river as a valuable resource before an active ecosystem. This most recent attitude wavers only when the river swells and rushes to remind us of its inexorable nature; a power that humanity has historically fought to obtain control over.

This thesis work is inspired by the willful words of geographer J.G. Nelson of the University of Waterloo's Heritage Research Centre; "when people understand and appreciate the long history and special qualities of [the Grand River's] landscapes, they will be more supportive of their conservation and stewardship"[1]. It is aimed at building on the individual's relationship with the river, and seeks traction through the underutilized tourism industry of the Grand River. Currently, a handful of paddling and rafting outfitters service the lower reaches of the river, providing guided tours with limited historical content. The Grand River Conservation Authority (GRCA) maintains educational signboards across their various parks, though they are unmapped and rarely updated with new information. Besides this, the GRCA keeps a listing on the national, provincial and local heritage plaques within the watershed to mark a significant person, place or event on the river, however, these do little to adequately reveal the complexities of its history. This thesis proposes an alternative to the fragmented private services and prescriptive plaques, and, instead, uses architectural and landscape design to unify the river and animate aspects of the landscape's past. The meaningful histories of identity, use and occupation on the Grand River become the basis for designs that draw people into it.

Operating as a guidebook to paddling the Grand River, this thesis is organised into a series of five day-trips to be undertaken in a canoe or kayak downstream. The journey begins central to the watershed, at the Shand Dam north of Fergus, and finishes at an abandoned stone mill near Glen Morris. Each trip accounts for 3-6 hours of water travel combined with several portaging stints, arriving by the end of each day at a themed site and campground; *Displacing*, *Unearthing*, *Restoring*, *Gathering* and *Racing the Grand,* in sequence. The themes explore aspects of the Grand River's natural and cultural histories, engaging existing and revived qualities at each site, and encouraging moments of reflection along the journey. In order to experience the river, and to develop an immersive relationship with the capacity to learn from it, this thesis proposes that one must occupy the landscape the same way that the river does – physically, dynamically, and continuously.

ACKNOWLEDGEMENTS

I would like to thank my supervisor, Jane Hutton, for her support and inspiration throughout this work. I would also like to thank the members of my committee, Rick Andrighetti and Rick Haldenby, for their kind encouragement in the final legs of this journey. Finally, I would like to thank the Grand River Conservation Authority for its boundless efforts in educating the public on the histories of the outstanding Heritage River System.

DEDICATION

This thesis is dedicated to all those who love a good trip on a boat, just like my grandmother did.

In loving memory,

Claudette Louvian Gladys Dix Patterson
July 14th, 1934 - March 25th, 2018

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List of Abbreviations

Agencies & Organizations

CA	Conservation Area
CHRS	Canadian Heritage Rivers System
CNR	Canadian National Railway
CPR	Canadian Pacific Railway
CWS	Canadian Wildlife Service (agency of federal government)
FON	Federation of Ontario Naturalists
GRCA	Grand River Conservation Authority
GRCAPC	Grand River Conservation Area Protection Coalition
GRCC	Grand River Conservation Commission
GRFMP	Grand River Fisheries Management Plan
GRNC	Grand River Navigation Company
GRW	Grand River Watershed
GRVC	Grand River Valley Commission
MNRF	Ontario Ministry of Natural Resources & Forestry
N-Park	National Park
NCC	National Capital Commission (Ottawa)
PK	Public Park
PNR	Provincial Nature Reserve (a category of park owned by the provincial government)
P-Park	Provincial Park
PWA	Provincial Wildlife Area
RWQP	Rural Water Quality Program (GRCA)
SC	Sailing Club

Designations

ANSI	Area of Natural or Scientific Interest
ESA	Environmentally Significant Area

Documents

GRA	Grand River Act (Ontario Provincial Legislature)
SBG	Transport Canada's Safe Boating Guide, Safety Tips and Requirements for Pleasure Craft
TGS	The Grand Strategy for Managing the Grand River as a Canadian Heritage River (GRCA)
WFP	Watershed Forest Plan (GRCA)

Mapping Abbreviations

ALY	Alley
AVE	Avenue
BLVD	Boulevard
BRG	Bridge
CT	Court
CRES	Crescent
CDS	Cul-de-Sac
CIR	Circle
CP	Camp
DM	Dam
DR	Drive
HWY	Highway
LN	Lane
PL	Place
PKWY	Parkway
RDWY	Roadway
RWY	Railway
TRL	Trail

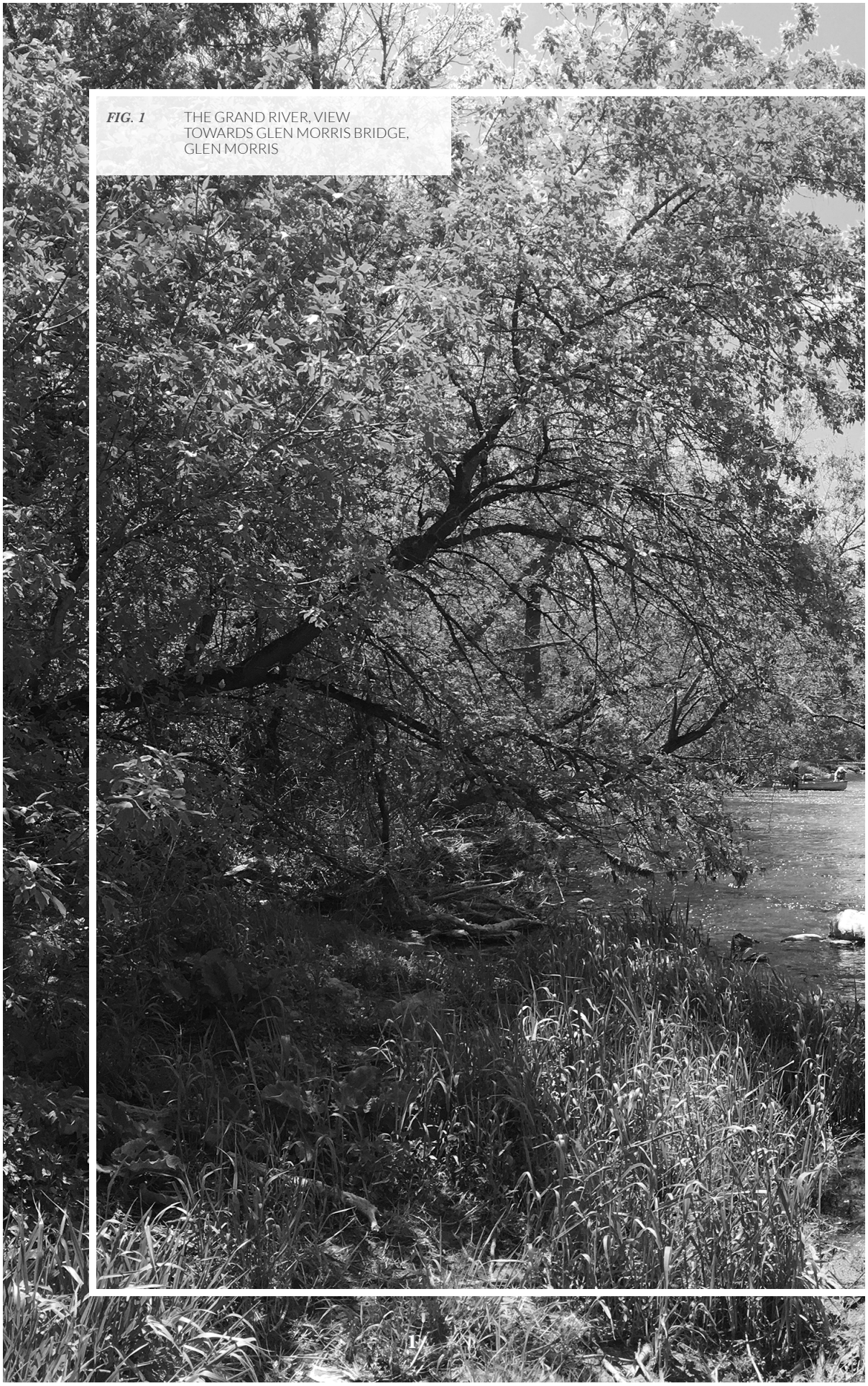
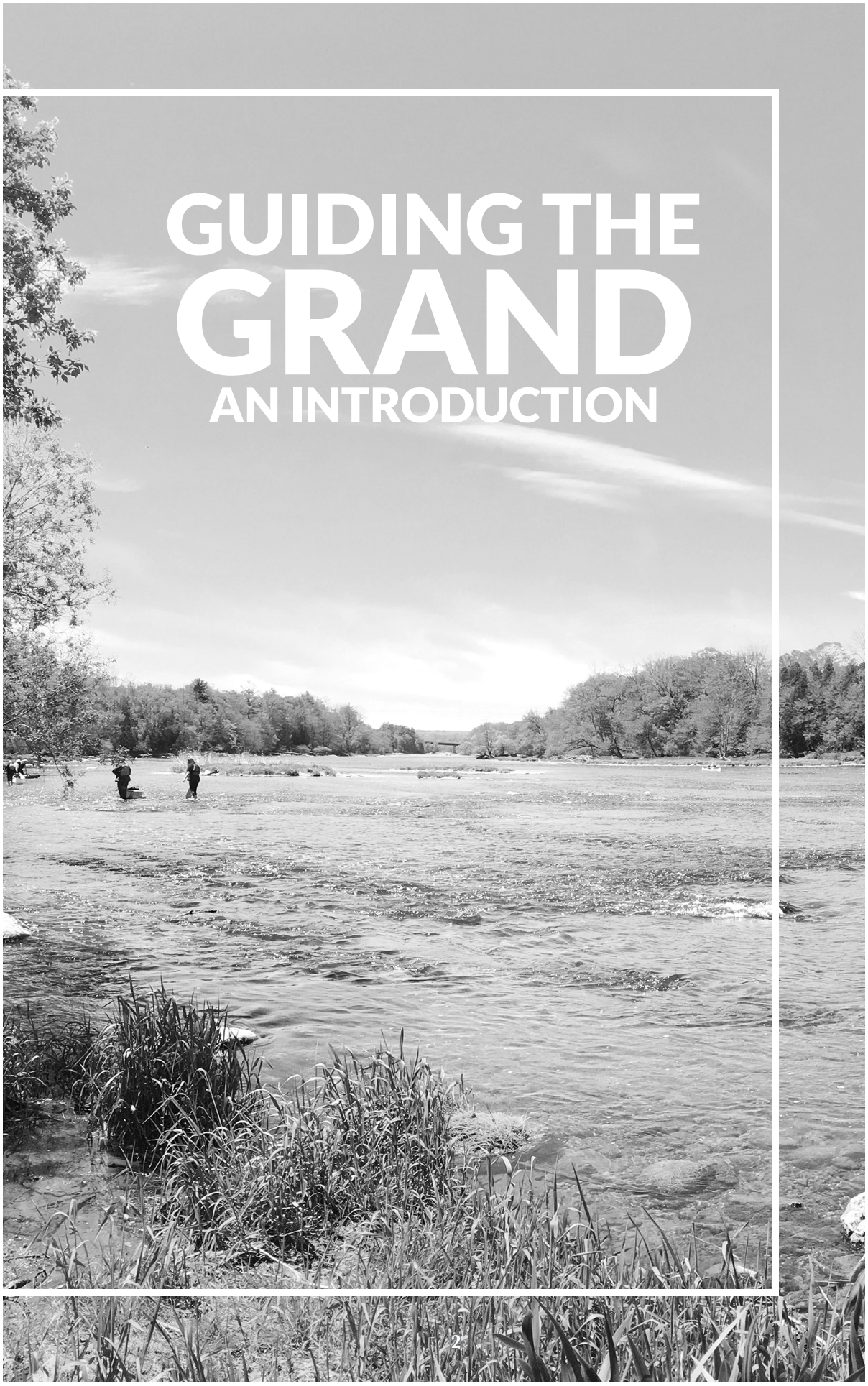


FIG. 1 THE GRAND RIVER, VIEW TOWARDS GLEN MORRIS BRIDGE, GLEN MORRIS



GUIDING THE GRAND
AN INTRODUCTION

Preface

This section provides a brief overview and reasoning behind the work in Guiding the Grand. It situates the river's historical relationship with humanity, and proposes the opportunity to reposition the lens that people view it through. The thesis format is explained as a method in altering perspective.

The Grand River has been viewed through various lenses by the human populations who have lived with it. The ancient and archaic indigenous peoples of North America were the first to occupy its lands, and the first to respect the river and its landscapes as living organisms. From archeological evidence in the central and southern parts of the watershed, these people hunted mammoth, elk and wolves, and eventually settled in areas to grow crops of squash, corn and beans[2]. Studies have shown that one site on the river could provide for generations before the need to relocate to another, allowing the earth the time to regain its nutrients.[3] The river also provided a connective system of transportation to the Great Lakes for the peoples of the region, traditionally by way of canoe and kayak. This relationship between people and riverine landscape represents the most harmonious in the history of the Grand River.

With the early European settlement of Southern Ontario, a broader range of human influences arrived on the banks of the Grand. The Haldimand Treaty of 1784 granted the displaced indigenous peoples of upstate New York's Mohawk Valley with the rights to the land 6 miles either side of the river. By the early 1800's, vacant lots of lands had started to be parceled off to European pioneers for profit. By the early 1900s, the River had undergone great alterations at the hands of the new settlers in the form of deforestation, damming and channelization to support the development of lumbering and milling industries in the watershed. These changes affected the river's capacity to retain floodwaters in the deforested areas upstream, resulting in destructive floods during the spring melt, and devastating drought during the dry periods of summer. Over the course of this active period, the Grand River underwent detrimental alterations that its present populations work continuously to correct.

It was in response to the threatening behaviour of the river that the growing populations of the Grand River Valley appealed to the Canadian provincial government for assistance in protecting the newly founded settlements along the river's edge from further flooding. The Grand River Conservation Authority (GRCA) we know today was a result of joining of two previously existing organizations, the Grand River Conservation Commission (GRCC) and the Grand River Valley Commission (GRVC). The GRCC was formed in 1938, when the Ontario Legislature passed the Grand River Act which ensured funding for water management on the river through a cost sharing formula between federal, provincial and municipal governments.[4] In 1942 the first major infrastructure built for water management on a Canadian waterway was constructed; the Shand Dam. The dam is a formidable form within its landscape, but the educational boards and plaques posted around the site do not adequately capture its histories. Informational boards of this kind limit the perspectives of its reader to a single history, discrediting the inherent dynamic nature of the landscape and its peoples, and the many influences that continue to shape them both.

The boards and plaques used to mark defining historical people, places and moments along the Grand River are fewer than many more are catalogued by today's version of the GRCC, the GRCA, as displayed in the figures on the opposite page. Even still, the information posted to these tourist markers omit important perspectives to complex histories. Occasionally, the remains of a once-prosperous stone mill are reinvented as a restaurant or inn, such as the Elora Mill Inn or the Cambridge Mill, and even less frequently,

a thoughtfully designed public space, like the Cambridge Mill Race. Alumnus Professor J. G. Nelson with the Heritage Research Centre at the University of Waterloo suggests that, "[w]ithout concern and care, older buildings can stand out amid a landscape of unsympathetic development and change" in the Grand River Watershed.[5] Regrettably, most mills and factories that once fostered entire communities now crumble dangerously behind fences and overgrowth. The Grand River often acts as a singular access route only to those recreationalists eager to experience these historic treasures, largely forgotten, and entirely uncelebrated along its banks.

The wealth of natural and cultural heritage on the Grand River is significant enough to have placed it on platforms of national and international recognition, with its Canadian Heritage River designation and Thiess International River prize for outstanding river management and innovation. This renowned stewardship by the GRCA with support from the municipal, provincial and federal governments could be exponentially advanced by further participation of the general public, as an educated body with an intuitive respect toward the river's identity. As Nelson says, "when people understand and appreciate the long history and special qualities of these landscapes, they will be more supportive of their conservation and stewardship"[6]. It is here that the contemporary citizen has a chance to participate in defining the lens through which they view Grand River today.

Guiding the Grand has been produced with the mindset that, in order to better understand the Grand River's complex histories, it is important to develop an individualistic relationship with it. It argues that the best way to develop such a relationship is by entering the river's water to gain personal experience with it. The form of a guidebook is designed to be accessible, with simplistic text and images that depict multifaceted ideas and information, allowing greater public reach. The thesis becomes an artifact that collects, quantifies and celebrates a series of events in history on the Grand River, making destinations out of obsolete industry and architecture. At the same time, the guidebook is an extremely personal item that any traveller would keep close at hand, curating the journey, and hopefully triggering a sense of understanding that might otherwise go unexplored.

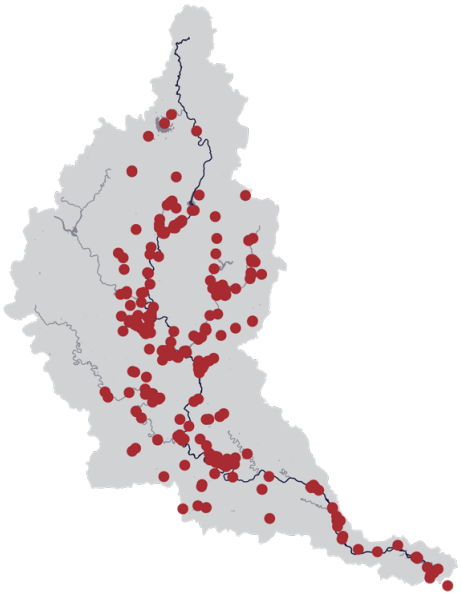


FIG. 2 GRAND RIVER WATERSHED GRCA ACKNOWLEDGED HERITAGE FEATURE SITES

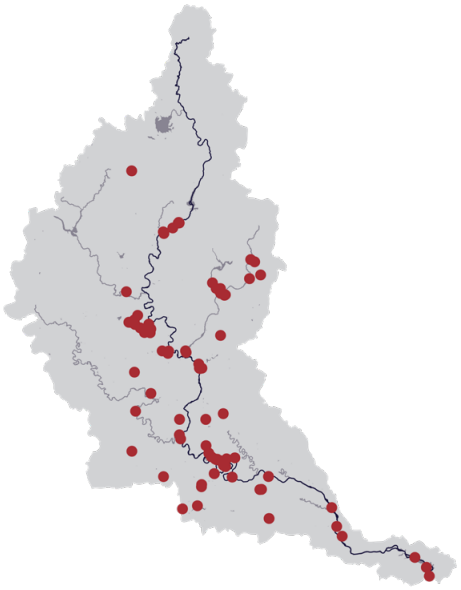


FIG. 3 GRAND RIVER WATERSHED PROVINCIAL & FEDERAL HERITAGE PLAQUE LOCATIONS

Grand Introductions

This section contextualizes the Grand River Watershed with regard to greater influences that have played a role in its identity over time. Here, the reader is introduced to the widespread features of the landscape, and the people who have shaped it. At the end of this section, a brief introduction is made to the active bodies that maintain and protect the river and watershed.

GRAND PEOPLES – Human occupation of the Grand River Watershed stretches back several thousand years, however, the earliest documented heritage on the Grand River is revealed only by the intelligible marks left on the land. Nelson wrote in his introduction to the Grand River's *Heritage Landscape Guide* that "heritage features and landscapes tell the story of the evolution of the land, the changing forests and wildlife, and the people who have lived in the Watershed" and that this land "reflects the many ways in which people of diverse origins have lived together over the centuries".[7] Carbon dating of arrowheads found in the Grand River Watershed have placed its earliest known human inhabitation at 11,000 years ago. During their time, the nomadic people who left these arrowheads, called the Paleo-Indian peoples, hunted mammoth and giant bison in the watershed lands. The next inhabitants of the watershed are called the Archaic, who hunted and gathered for thousands of years following the last glacial epochs. Following the Archaic are the Wooldland cultures of the Grand River Watershed, who were the first to plant crops in its rich soils. The Grand River was most heavily populated by these Woodland tribes between the 1400s and 1500s, before the Europeans first arrived in North America.[8] These three indigenous peoples tread lightly on the lands and waters of the Grand River, while witnessing the greatest amount of geologic transformation through their passive occupation.

The tribes that lived among the Great Lakes region were known to French European settlers as Iroquois, but who called themselves the *Men of Men*. Known for their settlements from east to west, the Mohawks, the Oneidas, the Onondagas, the Cayugas and the Senecas were distinct tribes that developed great conflict between them over time. A great union of the five tribes occurred in the sixteenth century, predating any European influences, bringing the "five nations into a lasting confederacy, a family of nations"[9]. A sixth tribe, the Tuscarora, joined in the mid-eighteenth century, forming the Six Nations. As a means of agreement, a strip of wampum embroidered with seashell beads called Hiawatha's Belt was created as a symbol of "love, peace and charity among five nations which have risen above their traditions of hatred, jealousy and constant warfare"[10]. The resolute peace and political success of the union of these formerly warring tribes is one nearly unseen in history.

The lands of the Grand River remained a neutral hunting ground for populations in the tens of thousands until wars between the Six Nations and rivalling Huron tribes eradicated them entirely[11]. As Europeans arrived, the hard wilderness of the Grand River region dissuaded settlement, and instead, was used as a convenient route to and from the United States, avoiding the challenges of the Niagara escarpment and Falls. From the 1650's through to the 1770's, the uninhabited

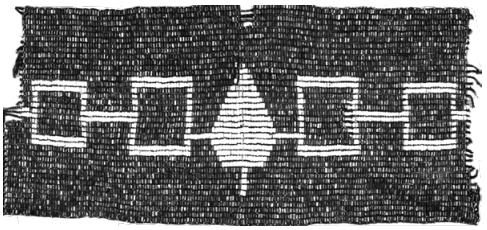
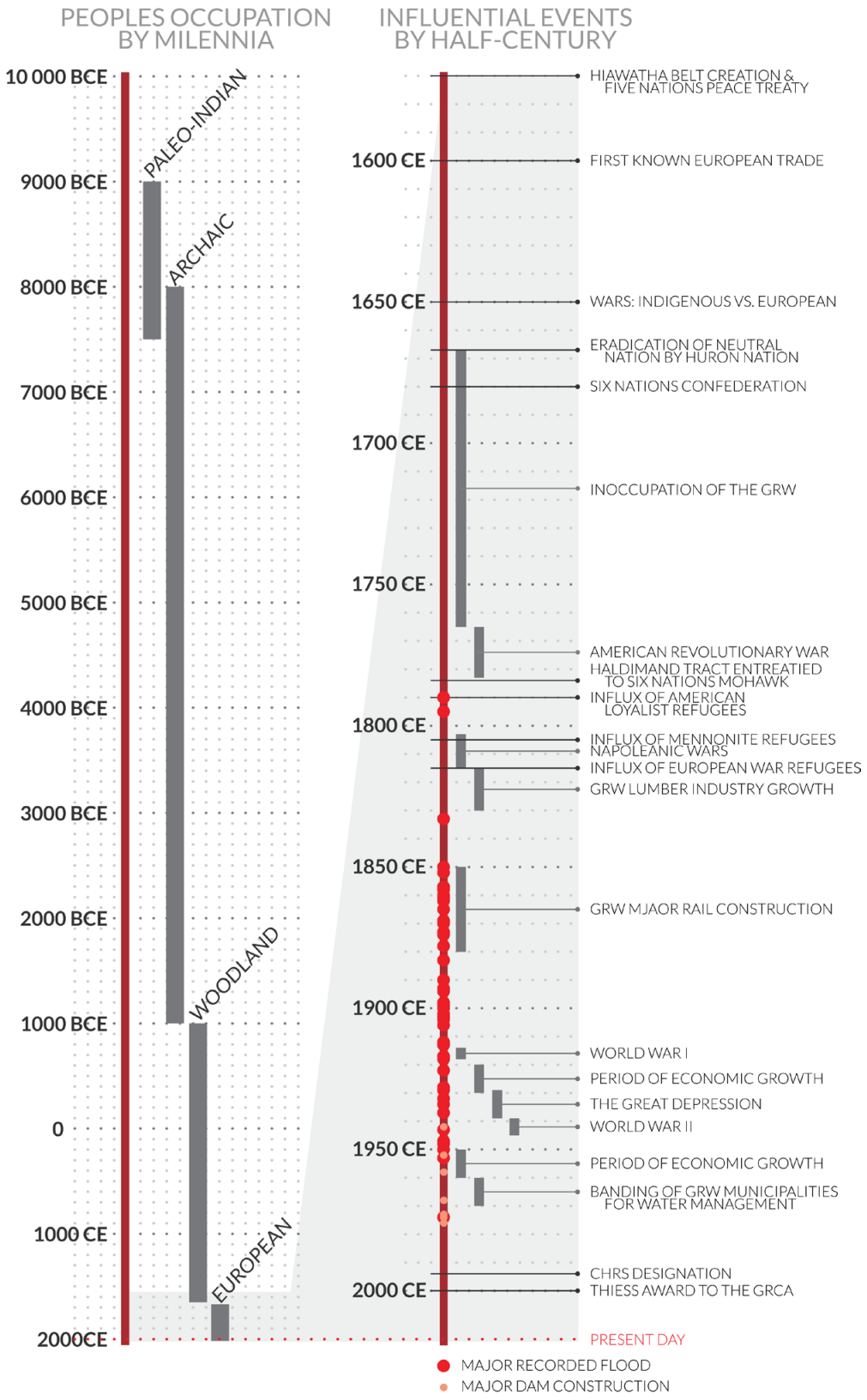


FIG. 4 HIAWATHA'S BELT, A WOVEN WAMPUM BELT SIGNIFYING THE UNION OF THE ORIGINAL FIVE NATIONS.

FIG. 5 GRAND RIVER WATERSHED OCCUPATION & INFLUENTIAL EVENTS TIMELINE

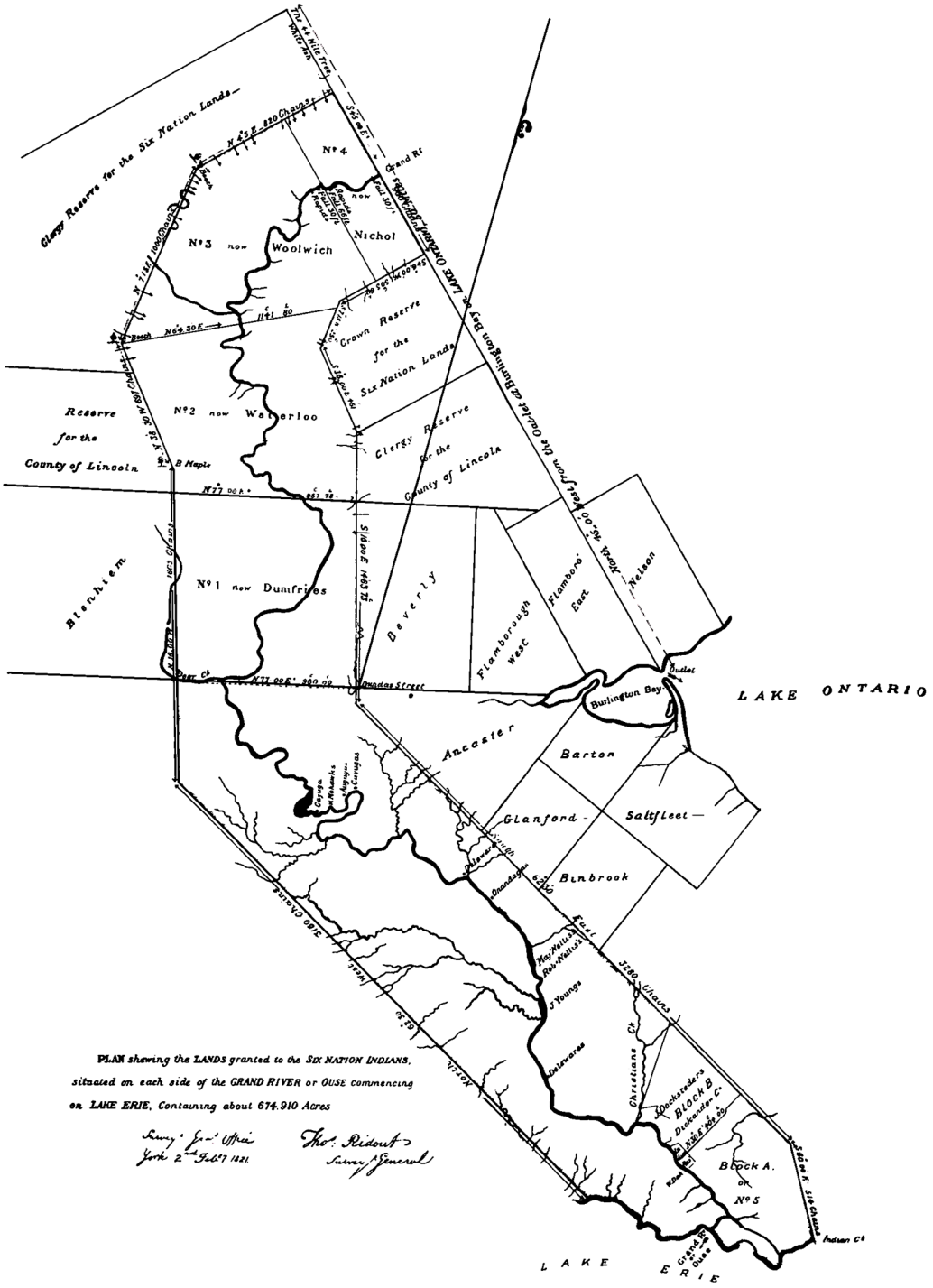


lands of the watershed served "as a hunting ground and a place of passage for natives and Europeans alike"[12], and any previously cultivated crop lands were left to return to a natural state. Through the American Revolution, Joseph Brant and his Empire Loyalist following from the northern United States were granted the lands 6 miles either side of the Grand River's entirety as their new home by the Crown. Brant and his people were offered the land as compensation from battles they fought south of the Canadian Border. At the time, the sheer scope of the lands was more than enough for the populations who laid claim to them, and so shortly after Mohawk occupation, the Grand River and granted lands on either side of it were divided into lots and sold off for profit.[13] By law, negotiations for the purchase, sale or transfer of lands within the Haldimand Tract required the knowledge and consent from both the Six Nations and the Crown, however this was rarely the case. According to a document published by the Six Nations of the Grand River titled *Six Miles Deep: Land Rights of the Six Nations of the Grand River*, "the Crown failed to uphold its trust responsibilities and participated in the dispossession of most of the Six Nations territory." The political drive to settle Southern Ontario effectively displaced the indigenous cultures who belonged to them. Political regulations hindered First Nations claims up until the mid 1970's, and since 1980, twenty-nine separate land claims have been filed against the Crown by the Six Nations of the Grand River, with on one claim resolved since[14].

By the end of the American Revolutionary War in 1783, large numbers of settlers entered the Grand River Watershed from the south.[15] These people were mostly land-seekers and religious refugees from war, or else officials and officers who wished to remain loyal to the Crown after its defeat. A notable population of Mennonite settlers arrived in the Watershed at this time. Their agricultural prowess and grounded religious lifestyle continue to influence major areas of the Watershed. English, French, Dutch, German, Scandinavian and Scottish immigrants settled amicably in new towns and villages, building a foundation of cultural heritage that persists in the Grand River Watershed today. A second wave of settlement arrived on the Grand River after the War of 1812 and the end of the Napoleonic Wars in 1815 steadily on into the 1900s, bringing greater numbers of British officers, recipients of Crown land grants, Scots displaced by land enclosures of the late 18th century, and Irish migrants escaping cholera and disease caused by the potato famines in the 1840s[16]. Today, the Grand River's diverse mosaic of ethnic origins is yet another facet in its valued cultural framework that speaks to the national heritage of Canada.

NAMING ORIGINS – The Grand River has known more than one name, and to more than one group of people in its 300 years of recorded history. The first map of the river was drawn in 1669, with the indigenous word, *Tinaatuoa*, coupled with the title "Riviere Rapide" by French travellers. It has also been recorded as *Urfe* or *Urse* in multiple maps between 1708 and 1763, and in 1755 "La Grand" appeared, marking only the mouth of the river. Less commonly, the names *Oswego* and *Swa-geh* were used, with the former used in correspondence by General Haldimand in March 1784.[17] It was officially renamed the English "Ouse" by Governor John Graves Simcoe in 1770s[18], however, the *Grand River* had been in common use by then, and would persevere to this day. Predating historical documents, and still used by the indigenous peoples of the watershed, the Men of Men called their river *O:se Kenhionhata:tie* [O-es-shin-ne-gun-ing], with the known colloquial meaning, "Willow River"[19].

FIG. 6 MAP OF THE ORIGINAL SIX NATIONS LAND GRANT AS SURVEYED IN 1821, SHOWING THE NORTHERN LIMITS OF THE GRAND RIVER GRANT ABOVE WOOLWICH



GEOLOGICAL CONTEXT – The geological composition of the Grand River Watershed is presented in layers of stone and organic material, formed, compressed and eroded throughout four major geologic eras. A sturdy bedrock of Canadian Shield granite makes up the deepest layers below the watershed, formed in the Proterozoic eon of geology when no lifeforms existed, by volcanic and tectonic activity. During the later Paleozoic era, shallow seas compressed clays and sand deposits into a second layer of dolomitic rock, which now reveal fossil remains of the rich marine life that filled them. The third recognized layering of material was left by the glaciers that passed and melted over the landscape during Pleistocene epoch, carving and piling the underlying formations of the watershed. The most recent glacial activity over the landscape has resulted in the Moraines, Drumlins, Eskers, Kettle Lakes and Till Plains that characterize it today. The fourth and top layer of the Watershed is the one that we interact with directly, and one which has seen great alteration at the hands of human development.[20]

In the second section of the following guidebook, titled *Unearthing the Grand*, explores the geological foundations of the Grand River and Watershed as a key characteristic of its natural heritage and identity.

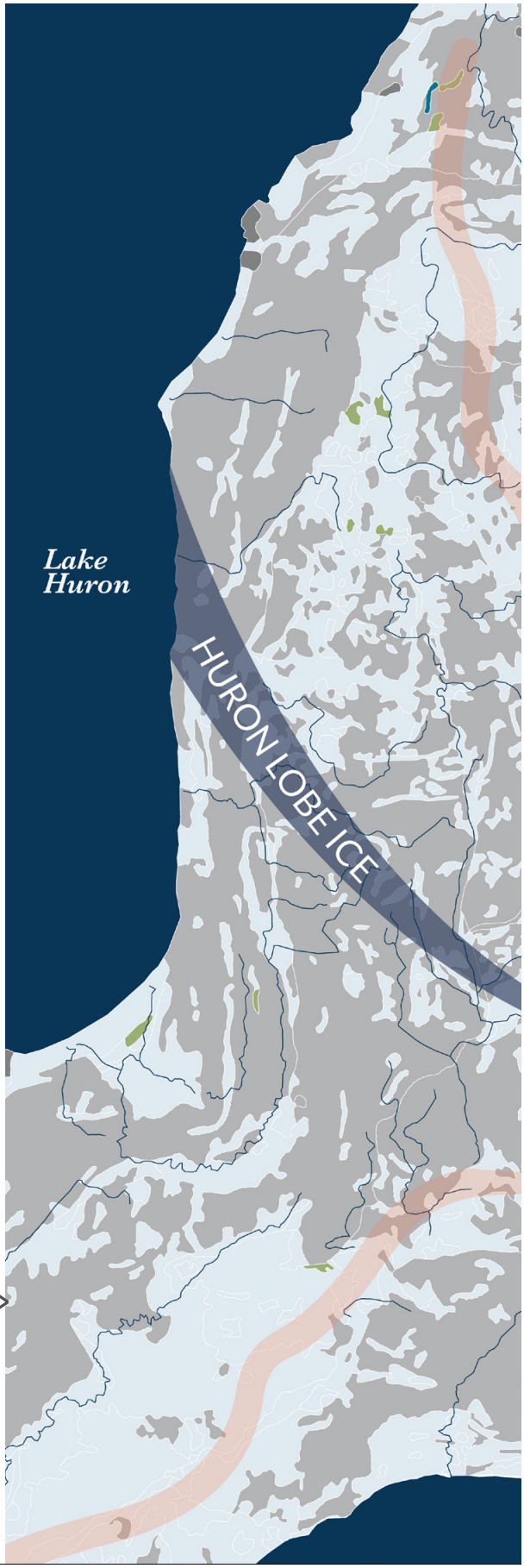
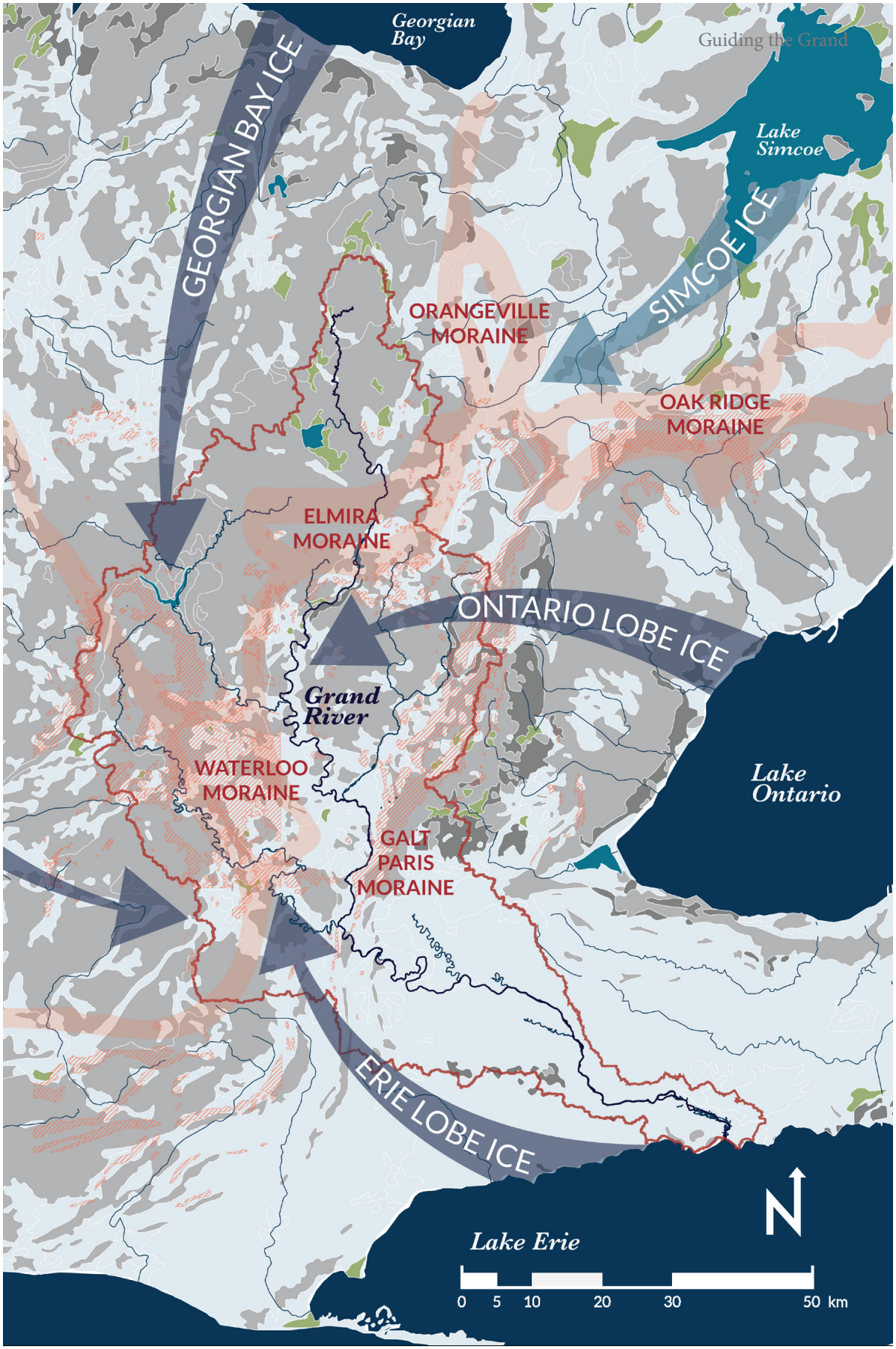


FIG. 7 GRAND RIVER WATERSHED GEOLOGY

- GRAND RIVER
- OTHER WATERCOURSE
- MORAINE DEPOSIT
- MORAINE FORMATION
- ORGANIC DEPOSIT
- TILL PLAINS
- GLACIAL DEPOSITS
- EXPOSED BEDROCK
- MINOR ICE LOBE SOURCE
- MAJOR ICE LOBE SOURCE
- WATERSHED
- BOUNDARY

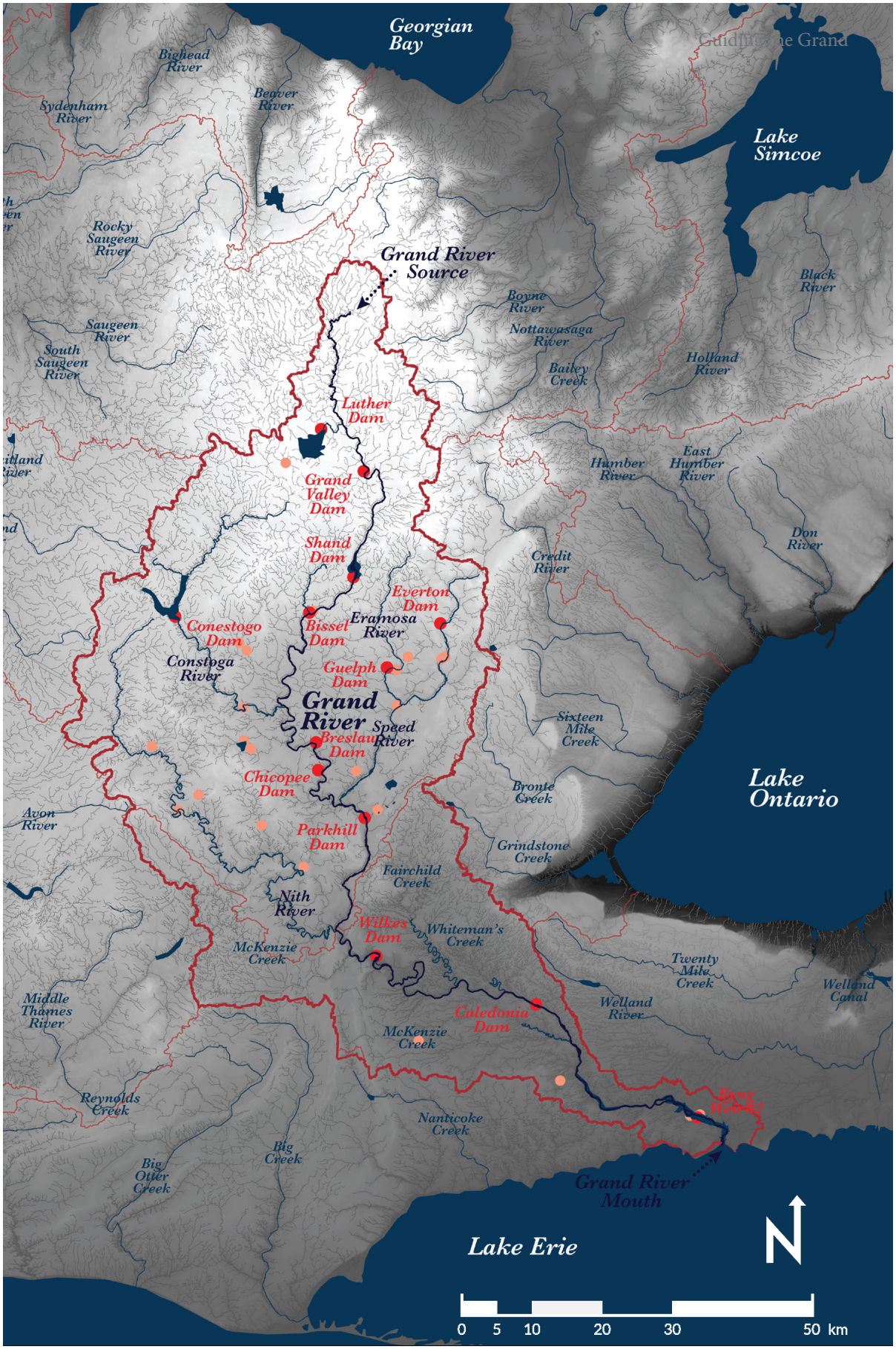

Georgian Bay
GEORGIAN BAY ICE
Lake Simcoe
SIMCOE ICE
ORANGEVILLE MORAINE
OAK RIDGE MORAINE
ELMIRA MORAINE
ONTARIO LOBE ICE
Grand River
WATERLOO MORAINE
Lake Ontario
GALT PARIS MORAINE
ERIE LOBE ICE
N
Lake Erie
0 5 10 20 30 50 km

HYDROLOGICAL CONTEXT – The extents of the Grand River system are called its watershed bounds, and which encompass 6,800 square kilometres of land in total, with a net elevational change of 351 metres. The Grand River's headwaters rise from Dundalk at the northernmost part of the Watershed, picking up the major tributaries of the Conestoga, Speed (Eramosa as a major tributary of Speed) and Nith Rivers, as well as numerous smaller creeks and streams as it travels a length of 298km down to its mouth at Port Maitland, at Lake Erie. The total combined length of all rivers and streams in the Watershed is about 11,000 kilometres.[21] An object dropped into the river at its headwaters would take an estimated seven days to arrive at Lake Erie[22].

In the fourth section of the following guidebook, titled *Gathering the Grand*, explores the water management practices of the Grand River and Watershed as a key characteristic of its cultural heritage and identity.

FIG. 8 GRAND RIVER WATERSHED HYDROLOGY

- GRAND RIVER
- OTHER WATERCOURSE
- MAJOR DAM
- KEY DAM / WEIR
- QUARTERNARY WATERSHED BOUNDARIES
- WATERSHED BOUNDARY
- WATERBODY
- DIGITAL ELEVATION MODEL RANGE OF DEPTH


Georgian Bay
Lake Simcoe
Lake Ontario
Lake Erie
Grand River Source
Grand River Mouth
Grand River
Bighead River
Beaver River
Sydenham River
Rocky Saugeen River
Saugeen River
South Saugeen River
Boyne River
Nottawasaga River
Bailey Creek
Black River
Holland River
Humber River
East Humber River
Don River
Credit River
Luther Dam
Grand Valley Dam
Shand Dam
Everton Dam
Bissel Dam
Eramosa River
Conestogo Dam
Conestoga River
Guelph Dam
Speed River
Breslau Dam
Chicopee Dam
Parkhill Dam
Fairchild Creek
Nith River
Wilkes Dam
Whiteman's Creek
McKenzie Creek
Caledonia Dam
McKenzie Creek
Sixteen Mile Creek
Bronte Creek
Grindstone Creek
Twenty Mile Creek
Welland Canal
Welland River
Dunnville Weir
Nanticoke Creek
Big Creek
Big Otter Creek
Reynolds Creek
Middle Thames River
Avon River
N
0 5 10 20 30 50 km

BIOLOGICAL CONTEXT – The sheer size of the Grand River Watershed denotes an impressive range in its various biological characteristics. Its lands reside in four climate zones; Dundalk Upland, Huron Slopes, South Slopes and Lake Erie, and the average annual temperature from its northernmost to southernmost point differs by 2.5 degrees celcius[23]. The Watershed can be divided into two forest zones; Alleghenian in the north, and Carolinian in the south. Current forest growth constitutes 19% of the overall land cover, a number that has been increased from 5% over the last century from the planting of more than 30 million trees in reforestation efforts following largescale settlement of the 19th century. The GRCA, with affiliated partner organizations, has developed a *Watershed Forest Plan* in ongoing efforts to spread these forests for a healthy watershed forest cover of 30%[24]. The river system is home to over 90 species of fish, and its wildlife reserves have reported that nearly 250 different species of birds migrate through it.[25]

The second section of the following guidebook, titled *Unearthing the Grand*, explores the species of note within the Grand River Watershed as a key to its natural heritage and identity. The third section of *Guiding the Grand*, titled *Restoring the Grand*, looks into the restoration practices that continue to promote and protect the natural species of the watershed.

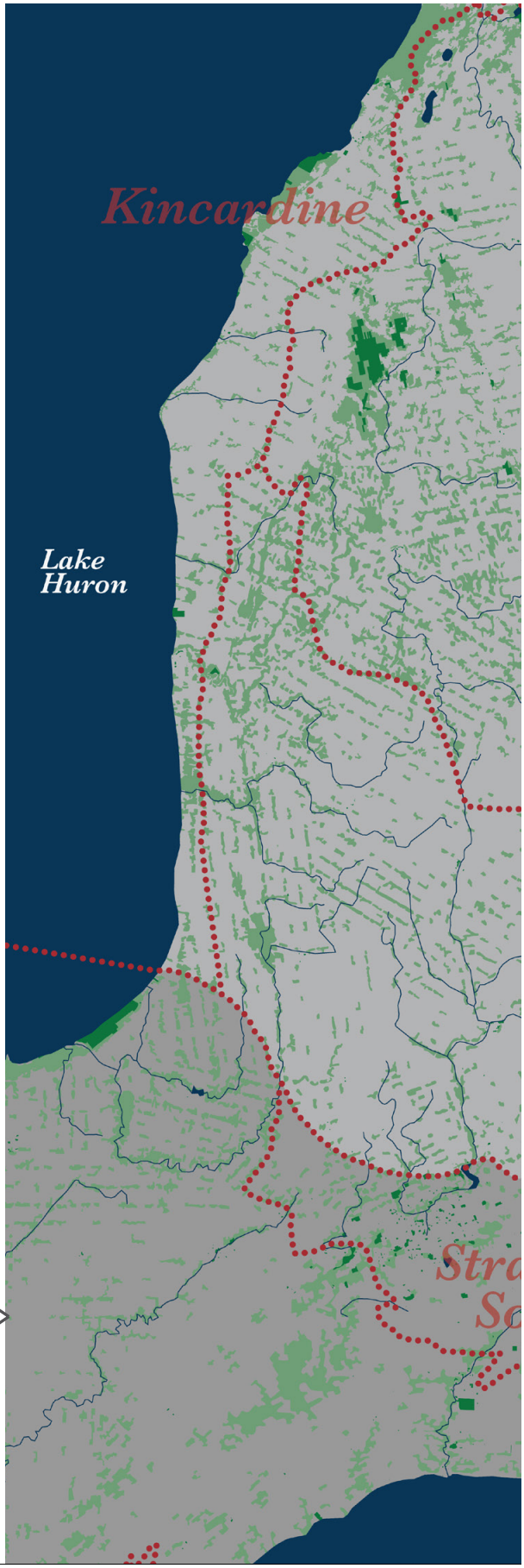
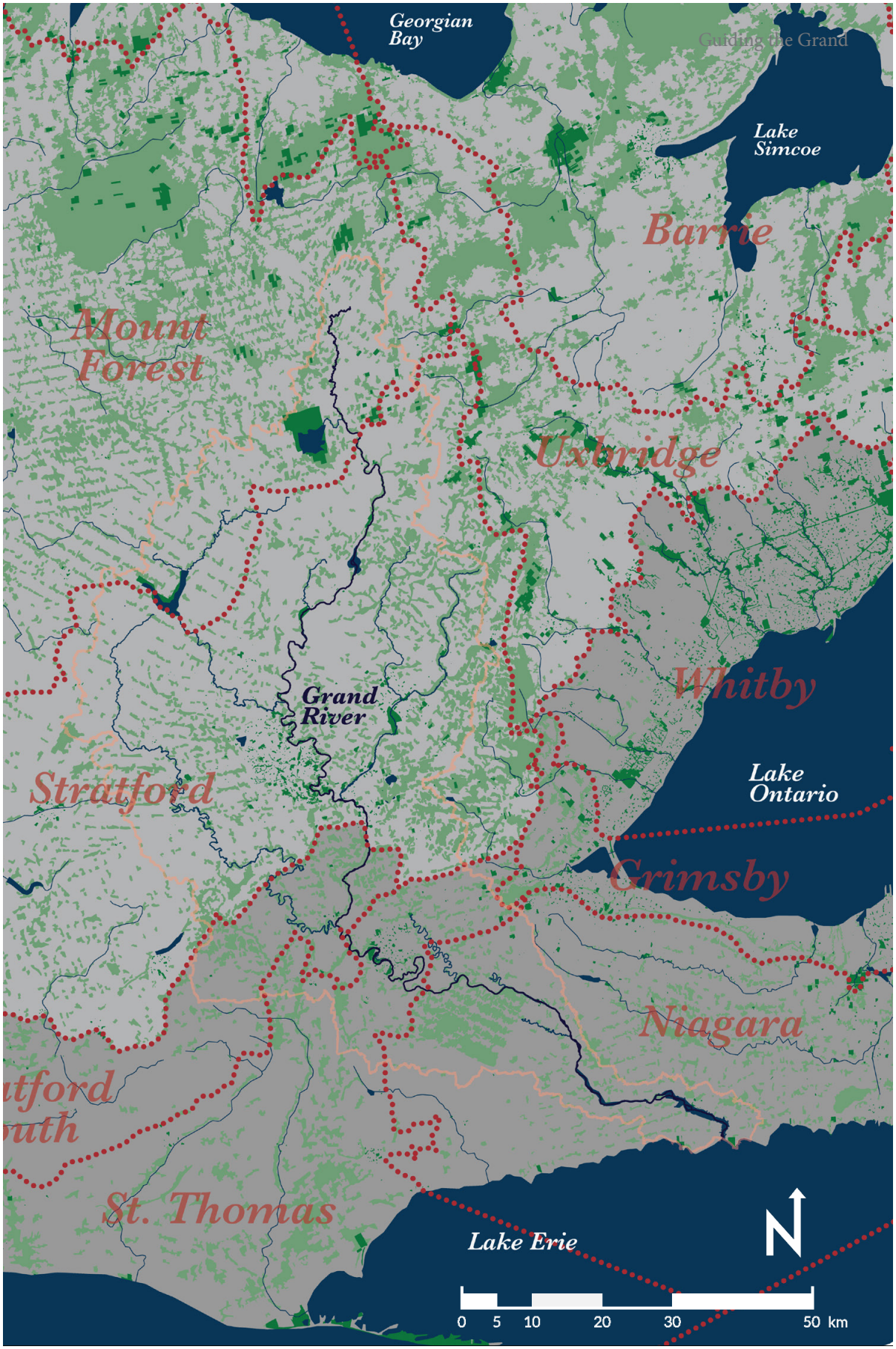


FIG. 9 GRAND RIVER WATERSHED ECOLOGY

- GRAND RIVER
- OTHER WATERCOURSE
- ECODISTRICT BOUNDARY
- WOODED AREA
- PARK
- ALLEGHENIAN FOREST
- CAROLINIAN FOREST
- WATERBODY
- WATERSHED BOUNDARY


Georgian Bay
Lake Simcoe
Barrie
Mount Forest
Uxbridge
Whitby
Grand River
Lake Ontario
Stratford
Grimsby
Niagara
St. Thomas
Lake Erie
N
0 5 10 20 30 50 km

URBAN CONTEXT – While agricultural uses will continue to dominate the Watershed's land cover, urban centres are concentrated at its centre. Nearly one million people call the Grand River Watershed home, with about five percent of the land cover occupied by cities, villages and towns[26]. The Grand River bisects many urban sites, including the major towns of Kitchener, Waterloo, Cambridge (a 1973 amalgamation of with the towns of Hespeler, Preston and Galt) and Brantford and the smaller towns of Fergus, Elora, Blair, and Paris. Most of these towns were founded during the economic boom in industrial economies during the 19th and 20th centuries, as well as in support of the steady growth of its agricultural industries.[27]

The fifth and final section of the following guidebook, titled *Racing the Grand*, covers the development and transportation efforts in the Grand River Watershed as key characteristics of its cultural heritage and identity.

FIG. 10 GRAND RIVER WATERSHED URBAN CONNECTIVITY

- GRAND RIVER & TRIBUTARIES
- BUILT UP AREA
- UTILITY LINE PIPELINE
- ROADWAY RAILWAY
- WATERBODY
- WATERSHED BOUNDARY


Georgian Bay
Barrie
Lake Simcoe
Dundalk
Hanover
Shelburne
Newmarket
Aurora
Orangeville
Markham
Vaughan
Belwood
Alma
Brampton
Toronto
Fergus
Elora
Inverhaugh
Acton
Elmira
Guelph
Milverton
Grand River
St. Jacobs
Waterloo
Kitchener
Lake Ontario
Caryndale
Hespeler
Stratford
New Hamburg
Blair
Cambridge
Ayr
Glen Morris
Paris
Hamilton
Brant
Brantford
Woodstock
Caledonia
Byng
Dunnville
Lake Erie
N
0 5 10 20 30 50 km

GRAND RIVER CONSERVATION AUTHORITY (GRCA) – The extents of the Grand River and its saturated lands are broad and require some complex systems of support to maintain them. The 1938 formation of the Grand River Conservation Commission (GRCC) has its roots in several economic and conservation efforts, including the Grand Valley Board of Trade (GVBT) established in 1929, as well as the Grand River Valley Commission (GRVC) founded in 1934. The latter two of these organizations struggled in their time due to lack of the necessary economic support, until the federal government became involved in 1938, when the Grand River Act was passed by the Ontario Legislature, with a formula for cost sharing: one quarter from the municipalities of the Grand River, and the remainder divided equally between the federal and municipal governments[28].

The GRCC was reformed as the Grand River Conservation Authority in 1965, and now operates with 10% of its revenue from the provincial government, 30% from its municipalities, and the remainder self-generated through its parks, hydro-electricity generation from its dams, and other services. Today, the GRCA represents nearly one million people across 39 municipalities in the management of water and other natural resources within the watershed. With its headquarters in the central city of Cambridge, Ontario, it supports the causes of "protecting environmentally important eras, providing recreational opportunities and promoting the environmental stewardship in urban and rural areas" [29].

GRAND RIVER CONSERVATION FOUNDATION (GRCF) – Founded in 1965 in conjunction the GRCA, the Grand River Conservation Foundation (GRCF) works to direct funds made through donations toward GRCA projects. Its aims are aligned to the steadily increasing populations of the watershed, with the consideration that "as we contemplate this growth, we must also consider the best way to maintain the balance between human prosperity and the health of our natural systems for the long-term sustainability of our people, wildlife, lands and most of all, our water"[30]. Its goals are to:

empower the GRCA to achieve conservation results through recreation, education, and restoration,
engage donors to support health and prosperity within the Grand River watershed, and
develop a sustainable community for future generations

A CANADIAN HERITAGE RIVER SYSTEM (CHRS) – In 1994, the Grand River received *Canadian Heritage River* status from the Canadian Heritage River System (CHRS), placing it among the more than 40 Canadian rivers celebrated for their historical value, as well as their ongoing role in Canadians' health, in their communities and in their national identity.[31] The Grand River is one of the first densely settled rivers to be granted this designation, an impressive feat for a river that has battled heavy modifications through deforestation, drainage, damming and urbanization.[32] According to the Grand River Conservation Authority (GRCA), the role of the Grand River as a Canadian Heritage River is to:

provide an outstanding example of rivers located in a highly developed part of Canada;
serve as an outstanding representation of rivers in the Great Lakes Lowlands;
demonstrate the adaptation of Canadians to fluctuating river flows;
demonstrate the role of rivers in the early industrial and cultural development of Canada;
provide an opportunity for greater public awareness of the importance of the role of Native Peoples in the development of Canada; and
provide outstanding recreational and educational experiences in a natural setting, to millions of urban Canadians.

The CHRS was formed in 1984 in agreement by the federal, provincial, and territorial governments in efforts to instill a greater importance on the historically prominent rivers of Canada. While this designation has boosted local interest in the Grand River Watershed, it does not identify the specific features of its natural diversity, nor does it enact any additional protections over the river. The GRCA points out on its website that the title "has no regulatory or legal authority or restrictions" [33], but rather, it gives rivers "national and international

regard" so as to "increase potential for tourism and economic development"[34]. For the Grand River, this recognition has been accredited to a renewed passion to preserve and protect the Grand River and its Watershed for its current residents and visitors, as well as for future generations.

THE GRAND STRATEGY (TGS) – In conjunction with the Grand River's designation as a Canadian Heritage River, in 1994 the Ontario provincial government and the Grand River Conservation Authority (GRCA) published a management plan, intended to guide the many stakeholders of the Grand River to better conserve, interpret and enhance the outstanding heritage and recreational resources of the river system and watershed. These stakeholders include the federal and provincial agencies, the GRCA, municipalities, Native Peoples, interest groups, associations, private businesses, educational institutions, and individuals[35]. The management plan is made necessary by the process of the Grand River's designation as a recognized Heritage River System, and made more important by the fact that nearly all lands within the watershed are privately owned. In order for the river to maintain its health, all residents should take part in its stewardship.

The Grand Strategy for Managing the Grand River as a Canadian Heritage River, known generally as the *The Grand Strategy*, is designed as "both a process and product"[36], with the intention of its ongoing use as a tool and platform for the general public to achieve its two long-term goals:

> *To strengthen, through shared responsibility, the knowledge, stewardship and enjoyment of heritage and recreational resources of the Grand River watershed; and to improve the well-being of all life in the Grand River Watershed.*

These goals are the collective sentiment of the many stakeholders who participated in public events held to develop the strategy early on. The document explores the beliefs, challenges, opportunities and guidelines to the encouraged stewardship of the Grand River and watershed, without legislation to regulate them.

FIG. 11 GRAND RIVER CONSERVATION AUTHORITY LOGO

FIG. 12 GRAND RIVER CONSERVATION FOUNDATION LOGO

FIG. 13 CANADIAN HERITAGE RIVERS SYSTEM LOGO

River Reading

The following texts have been important to the completion of this work, providing a great depth of knowledge in the Grand River Watershed and Valley, as well as general resources for research into the intrinsic behaviours of and necessary considerations for rivers.

GRAND RESOURCES – There is an extensive depth of knowledge on the settlement of the Grand River Watershed, and often the best resources are the products of research initiatives by the Grand River Conservation Authority (GRCA). Certain research efforts stand out as leading scholars reveal the histories of the Grand River, and whose writing has informed the majority of this thesis work. Listed below in ascending chronological order are those publications that have been integral to the completion of this work, and whose resources could be of interest for further perusal.

Renowned researcher and Librarian with Kitchener Public Library, one-time president of the Ontario Library Association and involved member of the Waterloo Historical Society, Mable Dunham authored a historical text titled *Grand River* in 1945. This book outlines both the indigenous and European settlement of the watershed in equal measure, supplying an outline to the historical achievements on the Grand River. The text is an important cultural touchstone for the human heritage explored in this thesis work.

The Grand River Conservation Authority is committed to work closely with municipalities and other partners to protect and enhance the natural resources of the Grand River watershed. In doing so, it also continues to support initiatives that seek to document, protect and provide resources for the public on the Grand River and the landscapes of its Watershed. *The Grand Strategy for Managing the Grand River as a Canadian Heritage River* is a report published for public reference in 1994. The central goal of this document is, "to strengthen, through shared responsibility, the knowledge, stewardship and enjoyment of heritage and recreational resources of the Grand River watershed", and "to improve well-being of all life in the Grand River Watershed".[37] The work of this thesis aligns to these goals, with a focus on those features relating directly to the Grand River with physical, environmental and experiential potential.

The GRCA published its first paddling guidebook, *Canoeing on the Grand River, A Canoeing Guide to Ontario's Historical Grand River*, first in 1982, with several updated editions to 2002. The text is an informative guide, which breaks the most travelled stretch of the Grand River into 16-25 kilometre day-trips, from Belwood Lake Conservation Area, down through Dunville onto the shores of Lake Erie. This guide is invaluable in both the extents and limitations of its content, as I am able to retrieve basic historical and practical knowledge to expand on and develop in this thesis work.

One of the texts that inspired the initial premise of this thesis work is the *State of the Grand River: A Focus on Watershed Issues*, a report published by the GRCA in 1997. In this report, it is suggested that, "[t]here is a basis for a strong cultural and eco-tourism industry within the Grand River Watershed", and that the Watershed "is underutilized as a cultural, recreational and educational asset".[38] It states that, while the designation of Canadian Heritage River has "enhanced public awareness and destination recognition", it remains to be seen what the next efforts to elevate that awareness will be. In response to this report, I began to think about how experiences in architecture might serve to spark an intuitive understanding in the landscape features and heritage buildings of the Grand River, and ultimately, how design could be used as an educational tool to reveal aspects of dynamic historical settings.

Mentioned previously, J.G. Nelson is an alumnus professor and past head of the Heritage Research Centre at the University of Waterloo, as well as the general editor of *The Grand River Watershed: A Heritage Landscape Guide,* a guidebook published in 2003. It is sponsored by the GRCA in efforts to "tell the story of what humans and nature have done with the land"[39] of the Grand River Watershed. It's stated intention is "to help people envision the long natural and cultural or human history of the Watershed…[and to] read this long historic record in the landscape tapestry of the region."[40]

Photographer and author Carl Heibert amassed a gorgeous collection of years of plane travel over the Grand River and its Watershed in the 2003 photographic essay titled *The Grand River: An Aerial Journey*. The aerial photographs in this book are a snapshot of the character of the Grand River, of its settlement, industry, heritage, and undeniable natural beauty, with each image accompanied by an informative blub on the historical or personal resonance of a place and time. Images from this book are reproduced in this guidebook, providing a different perspective of the Grand River.

The GRCA put out its most recent guidebook for paddlers on the Grand River in 2007, titled *Paddling the Grand River: a trip-planning guide to Ontario's historic Grand River*, authored by Staff of the Grand River Conservation Authority. This guidebook provides vital contemporary updates on safety, campgrounds and information pertaining to safe entry and exit on the Grand River from the previous guide published in 1994.

A compilation of essays and etchings by authors Marianne Brandis and Brander G. Brandis are thoughtfully gathered and presented in *The Grand River Dundalk to Lake Erie*. Historical tales are paired with imaginative images as a touching homage to the Grand River, as it travels through its Watershed, headwaters to mouth. This work provided a personal touch in better understanding the Grand River.

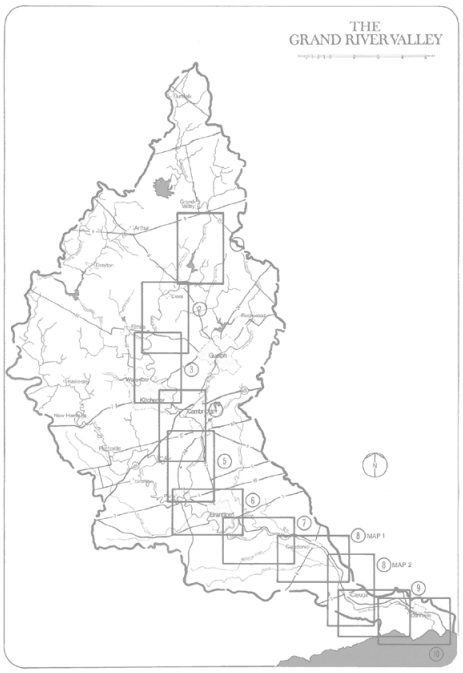


FIG. 14 OVERALL MAP & KEY PLAN FROM *CANOEING ON THE GRAND RIVER, A CANOEING GUIDE* BY THE GRCA

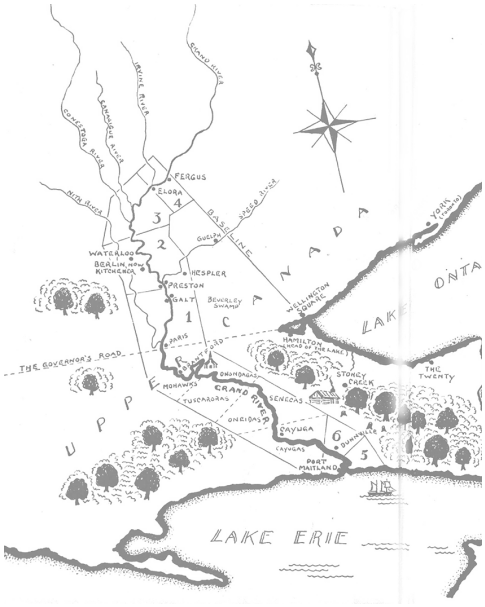


FIG. 15 INSIDE COVER FROM *THE GRAND RIVER* BY MABEL DUNHAM

RIVER RESOURCES – The subject of flowing water is one that has captured the interest of humankind since the time that people began to settle on the banks of rivers. It is important that research into the Grand River is contextualized among contemporary and historical literature that has defined this relationship between humans and the riverine landscape. The sources listed in chronological order below share relevant information pertaining to river myth, river histories, river design and river management across the world, and from which this thesis work has gained a strong knowledge base.

Full of extremely relevant information on the practice of paddling, *River Camping: Touring by Canoe, Raft, Kayak, and Dory*, is a practical instructional book authored by Verne Huser in 1981. In it, he lists the various topics essential to all manner of paddling, and then explains their contemporary and contextual application. Conservation plays a key role in this informative work, as Huser states, "let us all learn to use our rivers without destroying their appeal or reducing their capacity to tolerate our presence".[41] This work has helped to inform practical information on paddling for this thesis, and has presented an exemplary structure in its presentation.

The Path of the Paddle is another practical instruction publication, this time by author and avid canoeist Bill Mason in 1983. It establishes the technical apex in photographic demonstration for paddling strokes, equipment, maneuvers, while providing an in-depth guide to paddling terms and histories. This book, while somewhat dated, provides a studious documentation of the art of paddling. It has informed various aspects of paddling in this guidebook, including river navigation tips and watercraft selection tips.

In a 1984 publication titled *A Citizen's Guide to River Conservation*, authors Rolf Diamant, J. Glenn Eugster and Cristopher J. Duerksen work to encourage its readers with a strong basis in river conservation's relatively short history, and forewarn of the concerns regarding its future. They say that river conservation should be understood as "the wise use of a river and its adjacent shoreline so as to ensure that the value of its many resources, as well as the quality of life for people living near it, will not be dismissed over time or forever lost."[42] This book and its arguments has contributed to the driving concepts of conservation, the spread of awareness and education, and the appropriate levels of public, private and political application for this thesis work.

In the 2008 international conference proceedings, *Water and Urban Development Paradigms, Toward an Integration of Engineering, Design and Management Approaches* professor Jan Feyen of the Department of Earth and Environmental Sciences teamed up with professor Kelly Shannon of the Department of Architecture, Urbanism and Planning at the research university of K. U. Leuven to address the pressing questions that face water management, and how the integration of diverse disciplines would ultimately provide for better designed, engineered, operated and managed water systems. This writing contributes to argument that design plays a significant role in the way the public is able to understand the efforts of conservation and water management, and that with understanding comes a greater sense of stewardship.

In the multidisciplinary effort *River, Space, Design: Planning Strategies, Methods and Projects for Urban Rivers*, a result of a research project undertaken by Europe's *Process-oriented design of urban river spaces*, a team under supervisor Martin Prominski creates a design resource for designers in 2012. In keeping with the fundamental thinking of this thesis, it states "water, and the shaping of water landscapes by human hand, are the foundation of our cultures"[43]. The publication is envisioned as a tool for designers in the restoration and activation of riverine environments, with design precedents from across northern Europe.

FIG. 16 COVER FROM ***RIVER, SPACE, DESIGN*** BOOK COVER BY PORMINSKI ET AL.

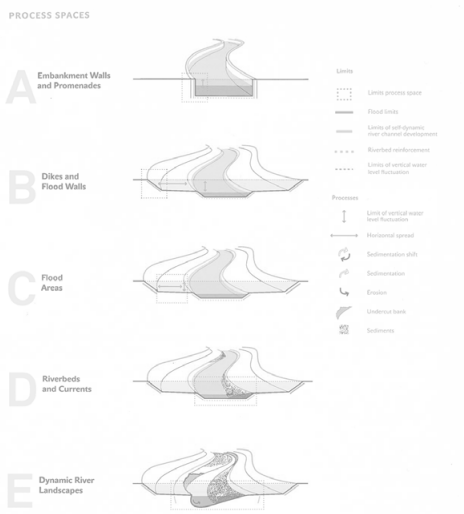


FIG. 17 PAGE 40 FROM *RIVER, SPACE, DESIGN* TEXT BY PORMINSKI ET AL.

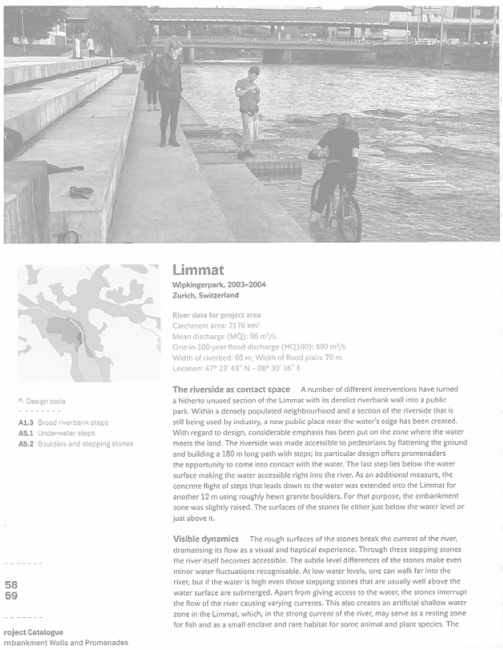


FIG. 18 PAGES 58 & 59 FROM *RIVER, SPACE, DESIGN* TEXT BY PORMINSKI ET AL.

River Design

The following section provides an insight into the design thinking of this thesis. It situates the Grand River within a contemporary discussion about that nature of rivers with a focus on humanity's role in their conservation. From there, a selection of existing public spaces on the Grand River reveal the current conditions of public river space, followed by some precedents of river design from across the world.

RIVER RIGHTS – Attitudes toward water as a natural resource have been shifting with the rise of devastating water crises across the globe. Rivers and coastlines that have long suffered through the development of great urban centres have gradually turned into threats of destruction, as a direct result of changing climates and the loss of the absorbent landscapes to urban sprawl. The role of water and riverine environments with regard to human settlement has historically been understood as a resource first, and a vulnerable ecosystem second. It is imperative, for the survival of healthy waterbodies and the human populations who depend on them, that this vulnerability be placed under universal protection from further damage, by both the public and private, the institution and the individual alike.

The Grand River is regarded as a remarkably healthy river system located within a highly urbanized area, but its health became a concern only half a century ago, when conservation was implemented across the watershed in the wake of devastating flooding and drought conditions. It is through the founding of the Grand River Conservation Authority (GRCA) and its affiliates, the local organizations and municipalities, that the roles of resource and ecosystem are gaining equal importance. The spread of this important balance, as championed by the GRCA through funding from municipal, federal, provincial and self-generated resources, has proven to elicit progress in the watershed. Internationally, a growing concern for the collective well-being of river systems has emerged in several countries where culturally significant waterbodies have been granted legal personhood. In New Zealand, the Whanganui River, and in India, the Ganges and Yamuna Rivers have been granted rights equal to those of its citizens, with human guardians appointed to represent them for the "restoring and ensuring the health and wellbeing of both" the rivers and the people who live with them[44]. The goals of protecting rivers will always align to the health and protection of its people, and as the world shifts its concerns toward sustainability, one cannot be considered without the other.

Former superintendent of the Marsh-Billings-Rockefeller National Historic Park and professor of the Historic Preservation Program at the University of Vermont, Rolf Diamant defines river conservation as "the wise use of a river and its adjacent shoreline so as to ensure that the value of its many resources, as well as the quality of life for people living near it" such that it "will not be dismissed over time or forever lost". [45] It is clear that, to a conservationist, the well-being of a river is linked irrevocably to the quality of life for its peoples. As such, great care must be taken in ensuring that this job is done well, and in perpetuity.

A river's health is directly reliant on its immediate environments: The prevalence or lack of forests and wetlands; the amount of chemical run-off from surrounding farmlands; the safe or unsafe disposal of harmful industrial waste from nearby factories; and the ability to cope with municipal waste from major urban centres. In the Grand River Valley, chemical runoff from largescale agriculture, urbanisation, development, construction and gravel mining are among the leading causes for major alterations to the river and riverine landscapes today, and that continue to threaten their health and conservation.[46] The GRCA regulates all activity on the Grand River, with strict guidelines that help to protect it from most adverse effects.

LIVING WITH WATER – To take an active role in the conservation of rivers is to take an active choice to benefit present and future generations. The infrastructural systems that filter, purify and transport clean drinking water to homes and businesses are typically hidden from site, creating distance between the concepts of the river as ecology and resource. In a work titled *Waterscapes*, landscape architect Herbert Dreiseitl discusses the representation of water in urban settings, and suggests that it is "the material basis of man's relationship with his environment, and often stands as a symbol of it".[47] The physical ways that we interact with water influence how we understand it, and is a representation of how we maintain a healthy respect within that relationship. There is a need, then, to bridge the disconnect of the quotidian interaction with water beyond the turn of a tap.

In its Watershed, the Grand River feeds nearly one million people through private well water, groundwater sources and filtered river water systems. It is used to transport and to purify waste water in 39 municipalities, through multiple distinct systems. It soaks the soils of 6,800 square kilometres of land, much of it used for farming, through its "aquifers, circulated rainwater and irrigation"[48]. This human dependence on the river's water is what makes it a valuable commodity, driving the need to manage it, and to design it. It is important, then, to consider the importance of source water protection, and how, in their everyday activities, populations can protect the water on which they depend.

The nature of a river lends itself to renewal, to a constant flow from an undiscernible source on toward a greater waterbody. Water is essential to human life, and bodies of water have always attracted human settlement in their capacity to nourish the life around it. The concept of 'living with water' comes from the Dutch approach in hydrological engineering, a relationship where people have gained great insight and respect for water through an unrivalled understanding of its nature. Water Management has been central to Dutch culture for over two thousand years, though, the concept of living with water, as opposed to

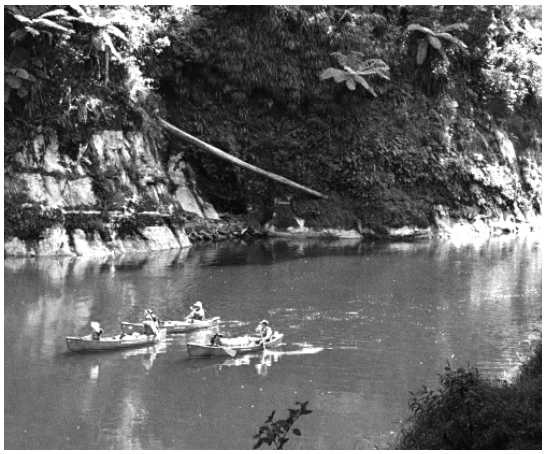


FIG. 19 THE WHANGANUI RIVER OF NEW ZEALAND WHICH WAS GRANTED LEGEL PERSONHOOD IN 2017

FIG. 20 THE GANGES RIVER, WHICH WAS GRANTED LEGAL PERSONHOOD IN 2017

working against it, has developed much more recently. In it, adaptive design and planning are used as a means of managing flood water, diverting it to areas designated 'unlivable', for example, underground parking garages and grazing fields for livestock.[49] Urban and infrastructure design on the Grand River has historically been built with the pretence to control the river, however, it has been proven that adaptive planning for the behaviours of the river would result in less damage and improved understanding for its peoples.

Feyen writes in his preface to the Water Paradigms Conference about human resistance to the lifestyle and perfunctory attitudes necessary to elicit change. Retrospective to the conference, a collection of current water issues across the globe, he suggests that "better local governance and community-led initiatives" are viewed as essential in the prospect of such change, but also "the role of education in the coming generations of architects and engineers in improving urban environments needs also to be recognized".[50] Designing with water must be an endeavor that involves all aspects of community, and education is the tool to achieve it.

WORKING WITH WATER – A program coordinated by the Water Institute at the University of Waterloo make up the *Collaborative Water Program*. This program brings together faculties across the university, including sciences, math, economics, environmental studies, planning, architecture and engineering to address a collective question of how to work with water as a multidisciplinary subject. Interdisciplinary work, or work that accommodates many factions of professional occupation relating to the management and caretaking of water and its environments, is central to its curriculum. This is an example of the forward-thinking methods that planners, scientists, engineers and designers are setting a standard in the contemporary approach to working with water.

This change in approach is important, because traditional methods of working with water have led to some adverse impacts on rivers. Rivers follow no manmade regulations, nor do they respect any borders or boundaries. It is a singular body,

FIG. 21 THE WATER INSTITUTE OF THE UNIVERSITY OF WATERLOO LOGO

and what you place in the water upstream will eventually arrive downstream. The creation and maintenance of dams can mean the loss of habitat for migratory fish, reducing the food chain for all life on the river. Water diversion, like channelizing and racing rivers, results in low flow and the drying up of watercourses. Pollution that seeps through the land from agricultural and industrial sites, and sometimes through acid rain, is often difficult to contain and can affect all areas downstream. Shoreline development can reduce recreational opportunities along rivers, and recreational development with insufficient planning can result in increased pollution, trespassing and fire hazards if not designed correctly.[51] These are the contemporary issues that efforts like the *Collaborative Water Program* work with, inclusive of the professions who hold a stake in the river, in order to respond with the greatest success for both people and the riverine environments.

GRAND RIVER EXISTING CONDITIONS – While there is much to be celebrated about the Grand River's health, it is a challenge to find well-designed public spaces that adequately reveal aspects of the natural and cultural identity of the river. The majority of public space with any proximity to the Grand River is often conceived with walkways separated from the river by thick brush or steep slopes that have been designed to deter erosion. Marked pathways are often riddled with offshoot footpaths made by rogue recreationalists trying to get closer to the river. This is a consistent phenomenon across several of the GRCA's parks and conservation areas, and reveals a general want for more curated opportunities to experience the Grand River up close.

Architecture that grew along the banks of the Grand River, especially during its periods of economic growth in the first half of the 19th century, is today abandoned or deteriorating behind hazard tape and fences. These relics of bygone industry are important to the identity of the Grand River, as they mark a period in time where people interacted daily with the river in a direct manner. Nelson writes on the attitude toward these structures, that concern for cultural heritage in the Grand River Valley was slow to surface, such that "[l]egislation and policies to provide protection of heritage buildings and districts were introduced in the 1970s."[52] Nearly 50 years later, and many projects have brought important heritage landmarks into the public realm through major renovations, but not enough is being done to save buildings like the Glen Morris Mill or the Kiddy Kar Factory of Elora from deteriorating entirely.

FIG. 22 REMAINS OF THE KIDDY KAR FACTORY IN ELORA

FIG. 23 REMAINS OF THE GERMAN WOOL MILL IN GLEN MORRIS

GRAND RIVER PRECEDENTS – There are a number of designed spaces on the Grand River that have been influential in the development of the designs in the following guidebook. These examples nourish the sense of exploration that the guidebook seeks to instill, through trails and environments that bring the river to the individual as much as possible, while providing the necessary functions of a trail, a park or a levee:

1. ELORA GORGE TRAIL, ELORA – The Tooth of Time stands as a naturally formed threshold marking the boundary between downtown Elora and the Elora Gorge, as it sits central to the falls on the Grand River just below the Elora Mill Inn. Past this natural heritage relic, the 25-meter-high walls of the Elora Gorge rise quickly and continue through 3 kilometres of "unparalleled opportunity to observe the layers of bedrock in the Watershed Area".[53] Previous to the nineteenth century, the Elora Gorge was clear-cut for construction and industry, and was one of the first locations in the Grand River Valley to have citizens enacting local conservation efforts. This area is now a recognized Area of Natural and Scientific Interest for Life Sciences (ANSI-LS), and a GRCA Conservation Area, and is protected as such. The geologic formation of these landscapes occurred through the travel of rapidly moving meltwaters from the Wisconsin Glacier during pre-historic times.[54] The trail carries a sense of heritage, with rounded walls constructed from local granite to protect unwary hikers from the steep drop to the river below. River access stairs from different eras are strewn throughout the park, allowing visitors the ability to occupy the base of the gorge alongside the river. The experience of occupying the river is something that this guidebook has taken on as a central operation of all design, and the use of local and indigenous materials and vegetation has been carried through several of the design sites within it.

2. DEVIL'S CREEK TRAIL & TUNNEL, COMPLETED IN 1996, RARE CHARITABLE RESERVE RESEARCH SITE, CAMBRIDGE – Portions of the Devil's Creek Trail pass through environmentally sensitive areas designated as both a Regional Environmentally Sensitive Policy Area (ESPA) and Provincially Significant Wetland (PSW) containing more than 30 rare plant species and located on the edge of a Carolinian Forest. This section of trail was originally created in 1996 with the construction of a sewer line using micro-tunnelling. After construction of the sewer, a road was created to allow the contractor access to the property for maintenance and replacement of vegetation. Although a multi-use trail was not part of the original plan, it was recommended and passed by City Council in 1998 and it now forms an integral part of the Cambridge Trail network connecting residents to the Grand Trunk Trail.[55] The success of this simplistic engineering project, one that was never even meant to have public access, is in the interdisciplinary efforts that surpassed the base minimum of its design intentions. The shallow basin that carries the water through its tunnel in a sheet toward Devil's Creek Falls controls the amount of water and creates a striking moment to appreciate its clarity and health. The finished design of a sewer tunnel becomes an elegant extension of the experience of a tributary creek travelling to meet the Grand River. The channeled water in this project has inspired the subtle channelized moments in this guidebook.

3. THE LIVING LEVEE & MILL RACE PARK, COMPELTED IN 1994, CAMBRIDGE – Mill Race Park is an integrated part of the Cambridge Living Levee Trail, a recreational elevated walkway that activates and enlivens the levee, and "reminds visitors of the importance of the river" and its industrial past.[56] Located within the Mill Race Park is a significant plaque from 1994 when the Grand River was commemorated as a Canadian Heritage River System. The surrounding area has been thoughtfully articulated with gardens, benches and varying levels of accessibility to the river, and a large amphitheatre provides views through the window openings of the old mill that used to stand in its place. The Mill was destroyed during the major flooding that occurred in the 1970's, with severe damages to downtown Galt. Its design was developed through a competition to protect downtown Galt from any future threat of inundation, and responded above and beyond the necessity of the project, providing a cultural and recreational hub for all admirers of the Grand River. This park and industrial architecture integration has been an inspirational work for this thesis to reference and respond to.

FIG. 24 ELORA GORGE TRAIL WALL IN ELORA GORGE C.A.

FIG. 25 ELORA GORGE RIVER ACCESS STAIR THROUGH GRANITE ROCK IN ELORA GORGE C.A.

FIG. 26 DEVIL'S CREEK TUNNEL PASS-THROUGH AT DEVIL'S FALLS IN (BLAIR) CAMBRIDGE

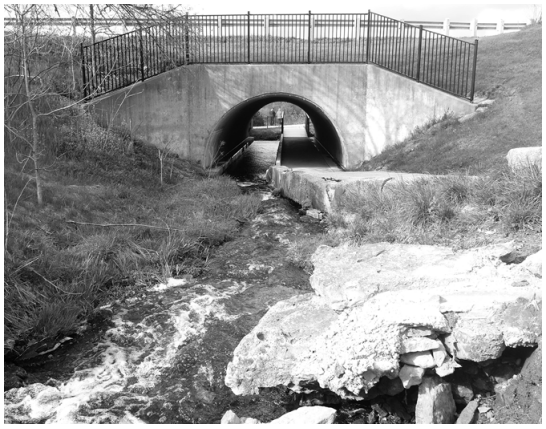


FIG. 27 DEVIL'S CREEK TUNNEL PASS-THROUGH TO DEVIL'S FALLS IN (BLAIR) CAMBRIDGE

FIG. 28 MILL RACE PARK AMPHITHEATRE IN CAMBRIDGE

FIG. 29 THE LIVING LEVEE BETWEEN PARK HILL AND MAIN ST BRIDGES IN CAMBRIDGE

LANDSCAPE & WATER DESIGN PRECEDENTS – River conservation and restoration is generally regarded as a recent movement in contemporary research and design, and great work is being done recently to activate old and new relationships between people and their riverine landscapes. The following are successful examples of landscape and architectural design that have inspired some of the relationships proposed in the following guidebook:

1. NORTHUMBERLANDIA BY CHARLES JENCKS, COMPLETED IN 2012, NORTHUMBERLAND, UK – Northumberlandia is a largescale art garden made traversable by a network of trails that 'draw' the figure of a woman around the landscape of mounds and pools. *The Lady is a joint project of the Blagdon Estate, a 10,000-acre family property that dates to 1698, and the Banks Group, an energy company. Banks is extracting coal from a surface mine next to the site. The entities wanted to create an iconic feature that would enhance a part of the site, given its visibility near a major highway and rail line…The female figure was formed over two years by the miners and their huge earth-moving machines using 1.5 million metric tons of clay, soil and rock excavated from the mine site.*[57] The historical resonance of the site, and use of the landscape in order to mirror it, is a methodology used in this thesis work multiple times. It's landforms and meandering trail, with cultural resonance in a mining industry, has played a significant role in the Snyder's Flats design site in this guidebook.

2.TOWN BRANCH COMMONS BY SCAPE, COMPLETED IN 2013, LEXINGTON, KENTUCKY, USA – Karst geology has shaped downtown Lexington - visibly and invisibly - since the city was founded…Rather than express the Town Branch as a linear channel, the project aims to reveal [porous] karst identity through a network of water windows, pools, pockets, fountains, and filter gardens that evoke and expose the underground stream. Town Branch is recast as hybrid hydrological and urban infrastructure, creating defined and safe space for water, pedestrians, bicyclists, and vehicles along its path. In the downtown core, streets are realigned to make way for an expanded public realm, where water is expressed not at the surface, but underground, as rainwater-fed filtration gardens clean the water of Town Branch before entering the culvert below.[58] This project is an inspiration for its adaptation to and celebration of pre-existing conditions of a waterbody's landscape. The thinking in it, of allowing the water to behave in its natural condition alongside the lives of its human populations, as a spectacle rather than a passive moment, is carried through this thesis work. This particular project is an inspiration in the interdisciplinary approach to water as a public resource and ecology.

3. WIPKINGER PARK BY LANDSCHAFTSARCHITEKTEN, COMPLETED 2004, ZURICH, SWTZERLAND – Within a densely populated neighbourhood and a section of the riverside that is still being used by industry, a new public place near the water's edge has been created. The riverside was made accessible to pedestrians by flattening the ground and buildings 180m long path with steps... The rough surfaces of the stones break the current of the river, dramatizing its flow as a visual and haptical experience. Through these stepping stones the river itself becomes accessible.[59] The strong current of the river is placated by the stone, as they interrupt the current and provide a shallow zone where during period of low flow, visitors can access the uncovered parts of the river. The simplistic and long-lasting approach to this design, coupled with its sensibility toward the dynamic nature of its river, has inspired the thinking in the design work in this thesis.

FIG. 30 AERIAL VIEW OF NORTHUMBERLANDIA GARDEN IN NORTHUMBERLAND BY CHARLES JENCKS

FIG. 31 DETAIL VIEW OF NORTHUMBERLANDIA GARDEN IN NORTHUMBERLAND BY CHARLES JENCKS

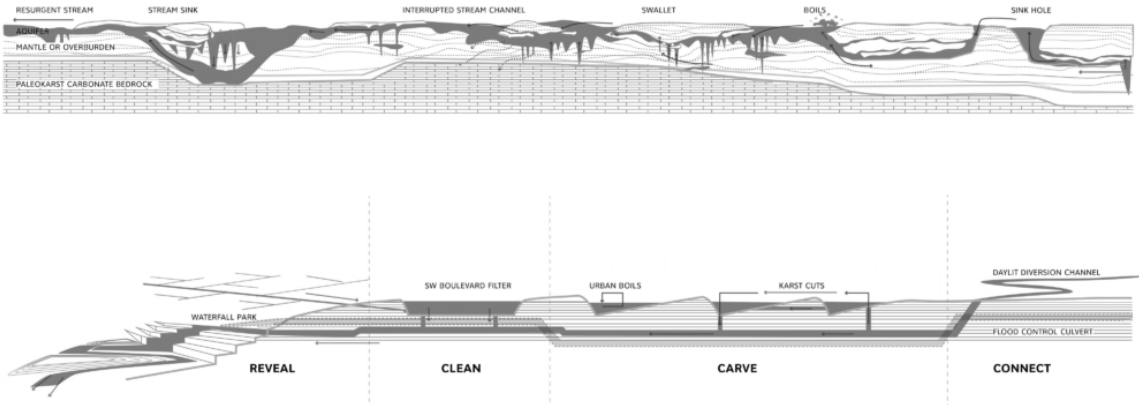


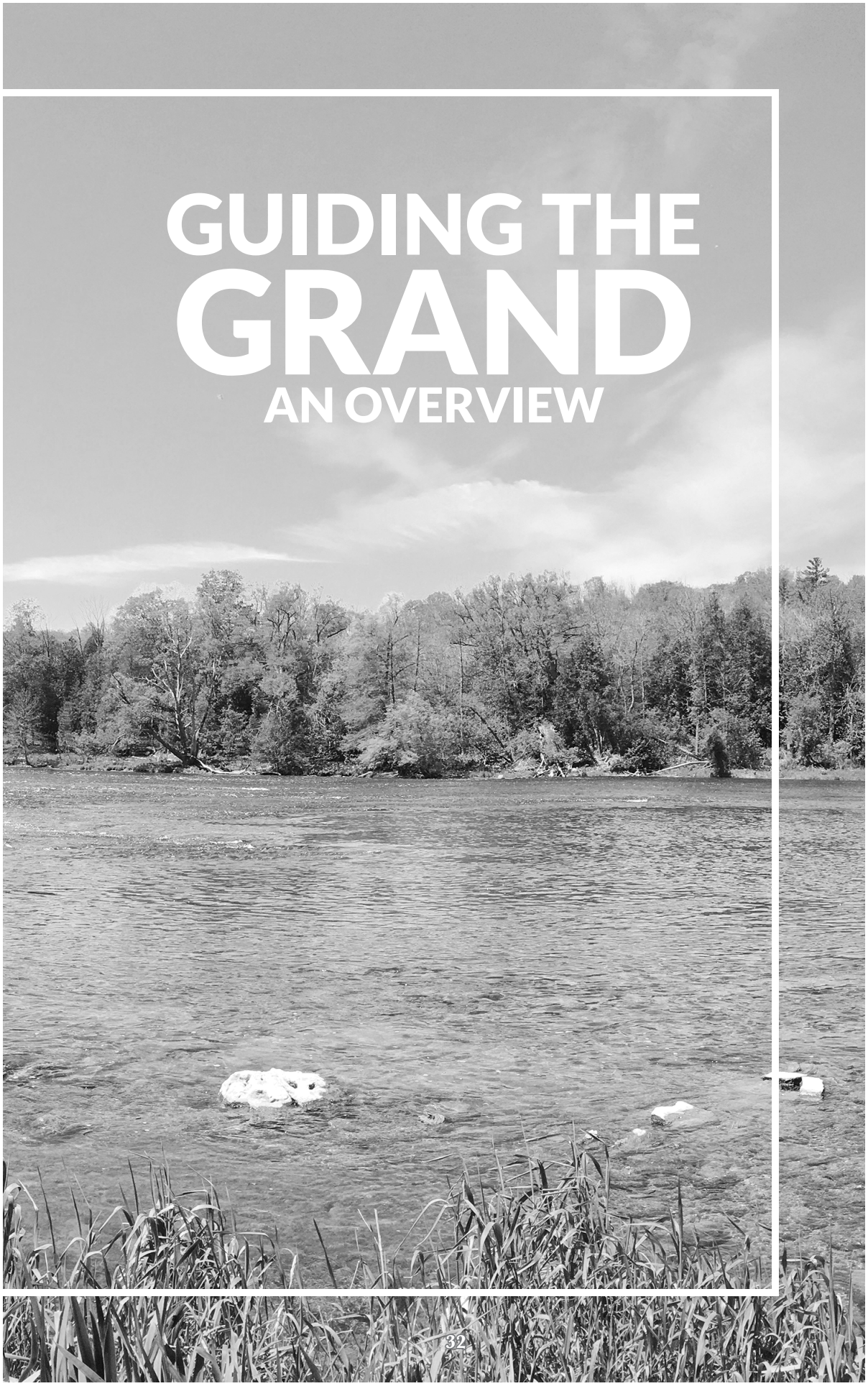
FIG. 32 TOWN BRANCH COMMONS IN KARST BY SCAPE

FIG. 33 DETAIL OF WIPKINGERPARK IN ZURICH BY ASP LANDSCHAFTSARCHITEKTEN AG

FIG. 34 WIPKINGERPARK IN ZURICH BY ASP LANDSCHAFTSARCHITEKTEN AG

FIG. 35 THE GRAND RIVER, VIEW TOWARDS GLEN MORRIS BRIDGE, GLEN MORRIS

GUIDING THE GRAND
AN OVERVIEW



Guiding the Grand

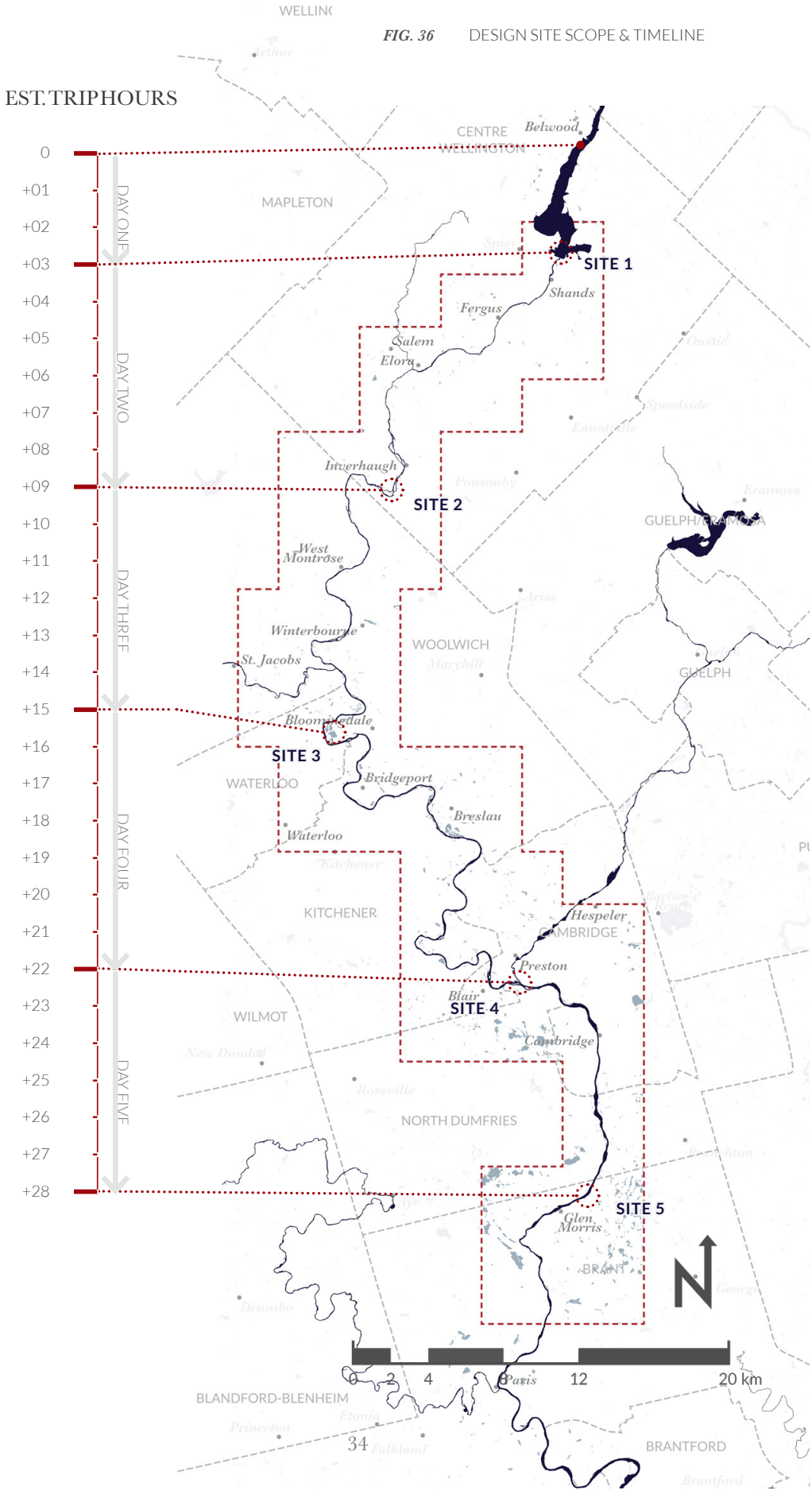
This section introduces the framework and operation of Guiding the Grand. It explores the scope, inspiration and design approach for the following five chapters of this guidebook.

It is important to note that the work included in this thesis beyond this point refers to a combination of existing and proposed conditions within the Grand River Watershed. The proposals within this document do not currently exist, nor have they undergone any form of review by the governing bodies within the watershed. The level of refinement in this proposal has been that of schematic design, and therefore will not take into consideration past, present or future regulations as they are imposed for new work within the watershed. This work has been completed as an architectural thesis, and in response to research.

SCOPE – As previously mentioned, the journey outlined in this work begins at the Belwood Lake, a reservoir created by Shand Dam north of Fergus, and is completed at the site of the German Woolen Mill near Glen Morris. The scope of this journey has been influenced by several factors including accessibility, natural and cultural richness, and scale. From research into various publications on paddling and camping, with specific texts on the Grand River, these chosen trips are generally regarded as the most travelled, providing the greatest accessibility and accommodation to the needs of paddlers. It is home to an impressive array of urban, rural and natural landscapes, many of which occupy lands right up to the river. Five day trips arrive at five unique sites, each with proposed campsites that are designed to support a continuous 5-day trip, or several shorter journeys.

The *Design Site Scope and Timeline* shows the visual and temporal extents of this work on the Grand River. Included in its scope are the geologic phenomena of the Irvine Creek and Elora Gorges, the transitional and distinct zones of Mixed Deciduous, or Alleghenian, and Carolinian Forests of the region, as well as extensive exposure to two of the three regional landscapes, the northern tills plans and central moraines. Culturally, this region of the Grand River accommodates the greatest amount of settlement, both urban and rural, across the entire watershed, including the cities of Waterloo, Kitchener and Cambridge, and the historic towns of Fergus and Galt, and villages of Elora and Bridgeport. The experiences of travelling through these five stretches of the Grand River will invoke a greater understanding of the multifaceted roles of the river with relation to both the human and the natural worlds, as they are intertwined, and to instill a greater sense of emotional connection to both. Through these emotional ties, this thesis proposes a greater sense of stewardship for the people who interact with the Grand River as an invaluable being within our own ecologic existence.

FIG. 36 DESIGN SITE SCOPE & TIMELINE



INSPIRATION – The Grand River is often acknowledged as a great resource for the municipalities within its watershed, but only a fraction of the populations who depend on it make conscientious efforts to conserve and protect it in their everyday interactions. It is universally appreciated as a remarkable figure within its natural surroundings, but it is rarely recognized as the singular dynamic element that has given form to every settlement, urban or rural, in the region. According to the State of the *Grand River Watershed, A Focus on Watershed Issues*, a report published by the GRCA in 1997, the Grand River Watershed has seen many recent advancements that have placed it ahead of many other watersheds of comparable size, in all facets but one: the overlooked potential for recreational activation at the site of the river itself. With the improvements in water quality and management, the protection of habitats for its wildlife, and in the informed processes of industrial and agricultural waste management, the river has been primed for an influx of leisure activity. And yet, more than ten years later, there is practically no new recreational activity on the river. In search of a way to bring populations closer to the Grand River, this thesis seeks to activate an explorative and individualistic approach to recreation on the Grand River, through the design and implementation of an architecturally curated journey on the Grand River.

APPLICATION – Shown here are excerpts from one of the guided chapters of this work. The sections contain images, illustrations, maps and written accounts of particular events that have informed each day's themed journey on the river. The maps show a range of scales, beginning at the scale of the entire watershed, through to the specific stretch of river chosen for a day's travel, down to the scope of a single design site, which is then diagramed at the scale of human interaction. Each section contains a title page, a historical analysis and a design proposal concerned with a chosen theme; the analyses consists of a written account of succinct histories paired with images and maps, a timeline and related *point-of-interest map* for the day's travel, a fold-out *travel map* providing greater detail in

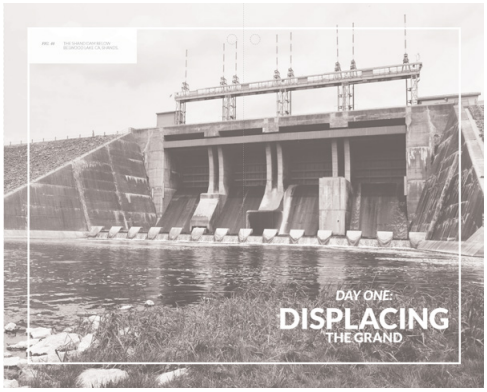


FIG. 37 GUIDING THE GRAND ANALYSIS SAMPLE SPREAD: TITLE PAGE

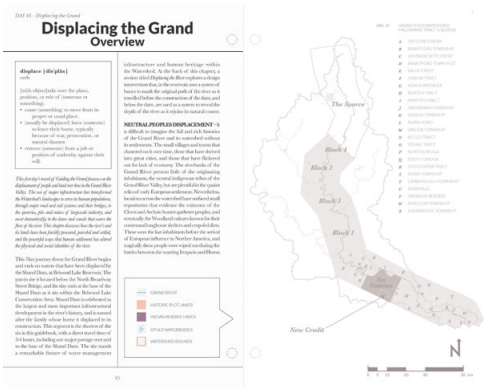


FIG. 38 GUIDING THE GRAND ANALYSIS SAMPLE SPREAD: OVERVIEW WITH WATERSHED MAP

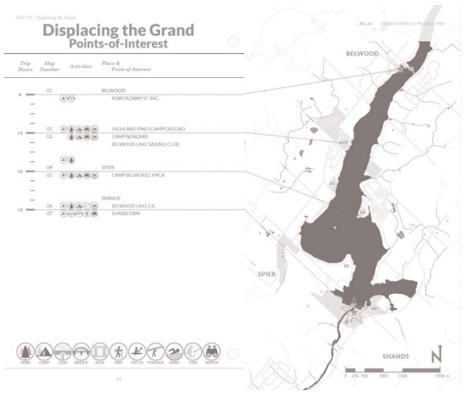


FIG. 39 GUIDING THE GRAND ANALYSIS SAMPLE SPREAD: POINTS-OF-INTEREST TIMELINE WITH MAP

the surrounding context, and a *site map* for the day's themed site. From there, the proposal for a designed intervention is explored with a brief description and a series of maps, diagrams and images which seek to inspire a greater potential for the tourism and recreation at each site.

DESIGN APPROACH – Each of the five themed sites has been envisioned with some key concepts in mind. At least one of the following four methodologies have been employed at each site in efforts to bring significant moments or objects from the past into the present:

INNOVATION vs. IMMITATION: Opportunities in riverine interaction are resolved through the introduction of new design; or, the existing typological problem resolution is respected, and accentuated by new design.

TIME & TEMPORARY ACTIVATION: The changeable nature of the river is made clear by signage & postings; seasonal accessibility is enforced by the put-up and take-down of camping platforms and the operations of hygiene amenities; and information is supplied by the GRCA to inform of safe weather & conditions for paddling.

PRESERVATION & RESTORATION: The intention is to contribute positively to and within a given environ while maintaining or restoring ecological health; to activate harmoniously with adjacent elements; to reveal identity characteristics in a way that encourages safe exploration; and to reveal the adverse effects of human intervention in an intuitive way.

APPLICATION vs INTEGRATION: Permanence in elements designed to integrate into identity of river and environs; protected storage is supplied at each site for seasonal aspects to be activated; materiality reveals purpose (e.g. Wood for impermanent, steel/fiberglass for semi-permanent, concrete for permanent).

FIG. 40 GUIDING THE GRAND DESIGN SAMPLE SPREAD: EXISTING SITE MAP

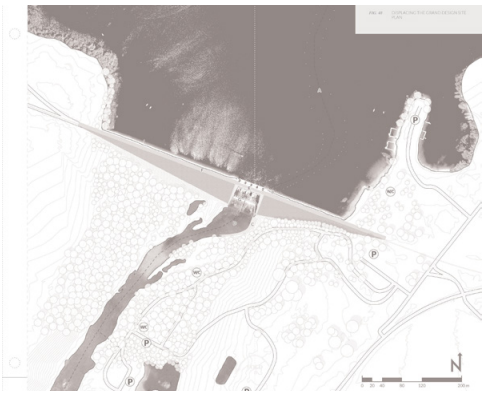


FIG. 41 GUIDING THE GRAND DESIGN SAMPLE SPREAD: DESIGN SITE MAP

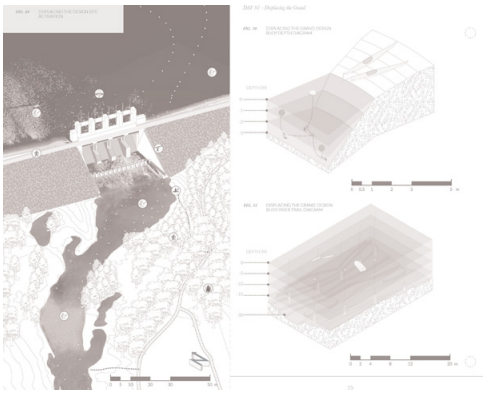


FIG. 42 GUIDING THE GRAND DESIGN SAMPLE SPREAD: ACTIVATION MAP WITH DIAGRAMS

Grand Designs

This section details the recurring design elements that unite the diverse experiences strung across the journey of Guiding the Grand *into one purposefully designed effort. It then provides an introduction to the five chapters in order, with a description of the distinct natural and cultural histories explored by each.*

GRAND ACCESS – Accessibility for your vessel is important to consider in a paddling experience. You should anticipate three instances where you will need to physically move your vessel over land. The first is to place your vessel into water; generally, you will need to carry your kayak or canoe to water from designated public access sites with nearby parking areas, either for your drop-off or for vehicle parking. The second is to *portage* your vessel around known obstacles that cannot be paddled; again, these sites are generally clearly designated, and will include a buoy line to mark dangerous areas during the paddling season. Third, you should expect to need to carry your vessel over shallow/rocky areas during periods of lower-than-usual flow.

At present, the Grand River's banks are majorly owned and operated privately. Public put-in sites are not always clearly labelled, are not consistent in their construction, and are often difficult to see from the river, which has led to accidental injury in the past. For the purposes of creating a consistent identity for paddling recreation on the Grand River, and to help visually connect the proposed design sites, the following diagrams show both a recognition and an accessibility standard for the approach and use of put-in/take-out sites on the Grand River.

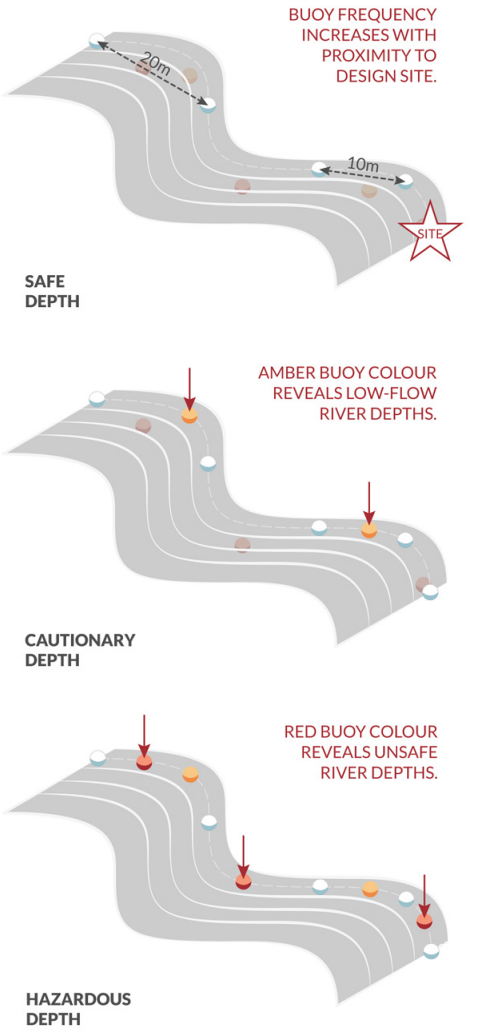


FIG. 43 GUIDING THE GRAND BUOY DIAGRAMS

Buoys are iconic objects within any nautical settings, and are most often employed to alert motorboat drivers of a wide range of information, including hazards, information, boating regulations and nearby diving/swimming areas. In this work, a particular type of buoy is used to help signify an upcoming design site, as well as to alert paddlers of unsafe water depths.

A put-in site should slope gently from dry land into the water in order to receive the bow of the vessel without damage from impact, and optimally, would be made up of organic material, like sand, silt, or gravel. For added stability and protection against erosion, the Grand River put-in and take-out sites include rounded concrete strips, imbedded in the sand or gravel, and positioned perpendicular to the river's flow, as shown. Embedded in these strips are metal rings for mooring.

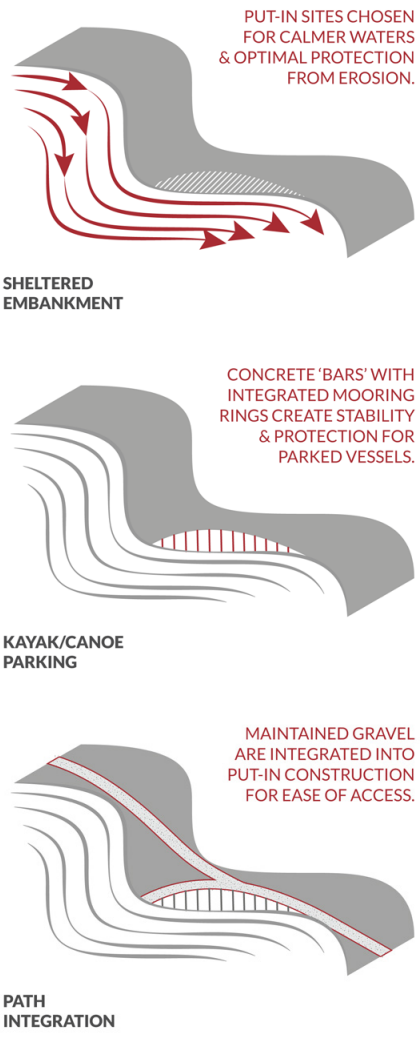


FIG. 44 GUIDING THE GRAND PUT-IN DIAGRAMS

GRAND AMENITIES – The GRCA manages several Conservation Areas and public parks within the scope of this work, including the Belwood Lake CA, Elora Quarry CA, Elora Gorge CA, as well as Snyder's Flats CA. Some of these sites provide campgrounds for recreational use, and with them, limited toilet and hygiene facilities. To encourage more overnight activation, each of the designed sites in this work include additional campsites, washroom and shower facilities. The washroom and shower facilities will run on septic systems, are all located out of the floodplain at each site, and designed only for use and access during the active paddling season.

Each site provides a series of camping platforms on a first-come, first-served reservation basis, however, the entire area designated *campground* site is available for campers to use. Each platform is composed of a lightweight frame placed over a level concrete foundation. The frames are designed to store off season in nearby sheltered space incorporated into the hygiene facilities buildings.

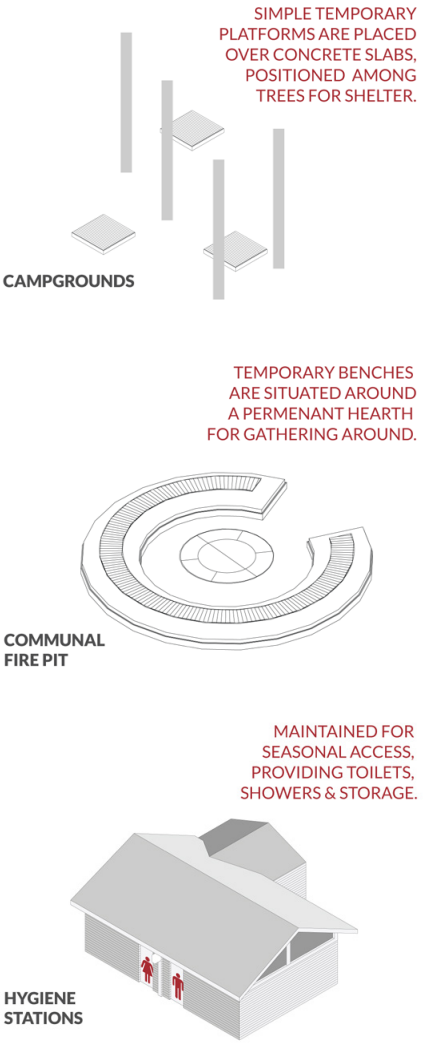


FIG. 45 GUIDING THE GRAND SITE AMENITY DIAGRAMS

GRAND CONSTRUCTION – The consistent force and unpredictable nature of the river's flow means that anything placed in its waters has an indeterminate lifespan. For reference, appreciate the depth and scale of erosion at the Elora Gorge, a granite landscape literally sculpted by the river over thousands of years of flow. The approach to materiality in this work respects the dynamic nature of this landscape through a hierarchy of material application.

Gravel, or crushed stone, has held an important place in the Grand River Watershed through its many industries in mining and extraction. The use of this material to maintain pathways across each design site is an important compositional connection to the valuable rock deposits that make up much of the surficial geography of the watershed.

In order to help create a contrast between the heritage construction of stone and mortar, reinforced concrete is employed to create simple foundations for the piers, platforms and canals introduced through each design.

The simplistic lines and intelligent structure developed over centuries on the river in the form of steel truss bridges is invoked in the slender use of steel columns, posts and beams as the main construction across each site.

Creating a sense of depth and tactility, wood-panelled platforms are interspersed with steel grate platforms, as defined by proximity to the water for both utility and longevity of the materials.

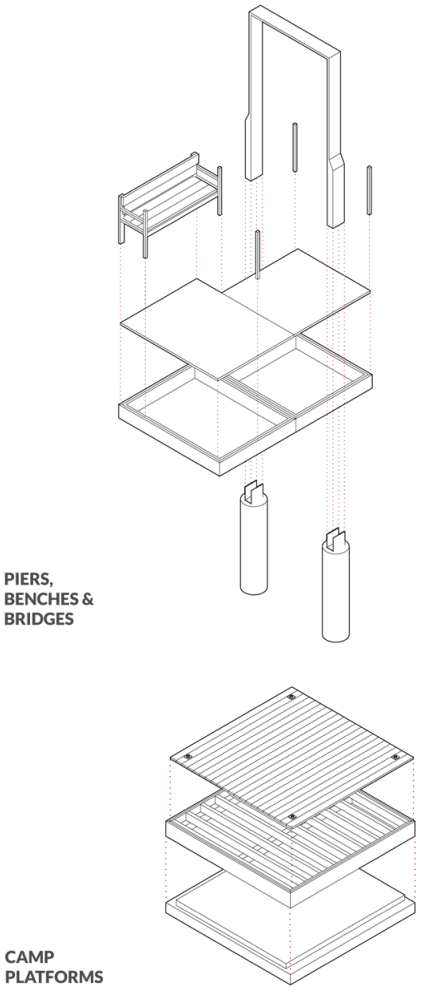


FIG. 46 GUIDING THE GRAND GENERAL CONSTRUCTION DIAGRAMS

SITE DESIGN – Each day's journey is designed around a particular characteristic theme that presents itself in multiple places across the Grand River Watershed. These themes inform the design thinking, which is then articulated to achieve heightened awareness of historical heritage particular to each site.

1. DISPLACING THE GRAND – This first day's travel of Guiding the Grand focusses on the displacement of people and land over time in the Grand River Valley. The use of major infrastructure has transformed the Watershed's landscapes to serve its human populations, through major road and rail systems and their bridges, to the quarries, pits and mines of largescale industry, and most dramatically, to the dams and canals that coerce the flow of the river. This chapter discusses how the river's and its lands have been forcibly procured, parceled and settled, and the powerful ways that human settlement has altered the physical and social identities of the river.

2. UNEARTHING THE GRAND – This chapter of Guiding the Grand focuses on the physical landscapes of the Watershed; what its natural regions are, how they were formed, and their present state in relation to the human and wild occupation of them. This section will take you from the bare rock of its geological foundations, through the rich gravel, clay and silt deposits left by glaciers of the region, toward its lush vegetative cover and the resultant wealth of its agricultural industry.

3. RESTORING THE GRAND – In this third chapter of *Guiding the Grand* you are carried through scenic rural landscapes that characterize the vast majority of land cover in the Grand River Valley. Mennonite culture has long been a major influence in land development of the Grand River Valley, particularly in the area travelled in this section, however, settlement in the area once held more industrial character from broader influences. Little urban sprawl or major industry is found today in the greater villages of West Montrose and Winterbourne, but echoes of a more industrial past linger in the road signs, and in the high capacity steel bridges that span the

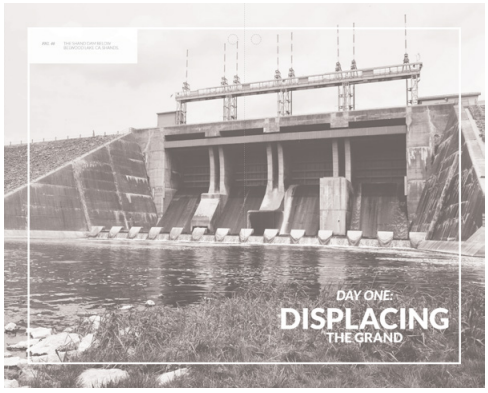


FIG. 47 DISPLACING THE GRAND: TITLE PAGE

FIG. 48 UNEARTHING THE GRAND: TITLE PAGE

FIG. 49 RESTORING THE GRAND: TITLE PAGE

Grand River in these historic areas. The Grand River Conservation Authority (GRCA) has taken part in many restorative efforts to bring greater health and awareness within the Watershed since the major deforestation and largescale industrial implementation during early settlement.

4. GATHERING THE GRAND – This fourth chapter of Guiding the Grand travels through the greatest diversity of land-use known to the Grand River, with exposure to a range of historically significant urban, rural, suburban, industrial and conservation conditions all in the same stretch. The peaceful coexistence denotes the greater efforts that come together to manage the Grand River as a resource, and to protect it from the harmful effects that human interaction can result in. As the agency that both guards and represents the entire Grand River system, the GRCA acts in partnership with the federal, provincial and municipal governments, as well as businesses, industries and individuals, in gathering necessary tools and methods to manage the river to an internationally acclaimed degree of accomplishment.

5. RACING THE GRAND – This final chapter of Guiding the Grand explores tranportation through time in the Watershed, beginning with the Grand River as a trade and travel highway for the peoples of the Six Nations, through the mastering of steam and combustion engines in passenger vessels and freight trains, toward our current automobile age. At the height of its population growth, and before the introduction of steam and electrical power, the Grand River was indispensable to the watershed's economy, both in production and transportation of goods and passengers.

These five journeys and their themed sites work to build a united relationship across the Grand River and its landscapes, to instill a greater sense of understanding through experience, and to evoke an emotional connection with the unique places made through architectural design. The dynamic nature of the river adds on the elements of time and environmental change to each of these experiences, acting as the catalyst to a broader understanding of its own nature.

FIG. 50 GATHERING THE GRAND: TITLE PAGE

FIG. 51 RACING THE GRAND: TITLE PAGE

Before You Go...

Nelson begins his *Heritage Landscape Guide* for the Grand River Watershed by stating "[the] diverse landscape and heritage of the Grand River Watershed is largely unknown to residents and visitors alike."[60] This statement hits directly on the purpose of this thesis work, and sets a challenge to its readers as if to say, *here is your opportunity*. This guide invites you to take that opportunity, and to enter into the landscapes of the Grand River in order to begin to truly know it.

IMPORTANT CONSIDERATIONS – While the Grand River presents great opportunities in recreational enjoyment, it should be approached with heightened caution and informed respect. It is recommended by the Grand River Conservation Authority (GRCA) to learn as much as you can about the section of river you intend to paddle before your trip. There are numerous positive experiences on the Grand River to be had, and each of them depends entirely on your willingness to learn, to protect yourself, and to respect the river.

This guidebook is limited to some of the most well-travelled portions of the Grand River, beginning at Lake Belwood above Shand Dam, and concluding just south of the riverside town of Paris at the site of an abandoned Gypsum Mine. It does not include information on any of the Grand River's major or minor tributaries and streams, though some of these are notable for their paddling recreation when flows are high enough to support it. This book is a historical and architectural guide to the natural and cultural heritage of the river, and not a canoeing or kayaking instruction manual. *Sources can be found in the Indexes of this guidebook for instruction and information on paddling*

Respect for the Grand River includes respect for fellow people and creatures on the river. It is important to leave all of the sites you visit the same way you came to them. Be sure to pack all litter and recycling to dispose responsibly after your trip. Keep your hiking and walking to designated paths to avoid trampling small animal habitats, delicate plant species and new forest growth. It is also important to note, possession and consumption of alcohol while operating a canoe or kayak is illegal.[61]

The information contained in this guide applies mostly to the summer season kayaking and canoeing during low-flow periods, however, advanced paddlers are known to enter the water out of season (Victoria Day through to Canadian Thanksgiving). While it is essential to review any safety warnings and precautions published by the GRCA before entering the Grand River, you are ultimately responsible for your own safety, and should avoid unsafe conditions on the river.

RIVER FLOWS & SAFETY – Factors like the time of year, reservoir water release, and weather conditions can affect the rate and level of flows and limit access to the river. During spring runoff, the water often flows too high and too quickly for safe paddling, whereas droughts in the summer and fall can make certain stretches of the river too dry and rocky to paddle. **The river is typically not paddled during the winter season, between Thanksgiving through to Victoria Day, as weather and climate conditions become unsafe for paddling**. There are times when the major dam network of the Grand River Watershed will release large amounts of reservoir water, resulting in higher flows for several days at a time. Additional to this, rainstorms can drastically increase the water levels of the river from many kilometers away within a matter of hours, and can last for several days.

In order to prepare yourself for known and anticipated conditions on the Grand River, the GRCA provides detailed information on their website for Kayaking and Canoeing as well as other types of recreation, including Birding, Boating, Camping, Fishing, Geocaching, Hunting, Swimming, Tubing, as well as wintertime activities like Skiing, Snowshoeing and Snowmobiling.[62] Sources can be found in the Indexes of this guidebook for further information supplied by the Grand River Conservation Authority.

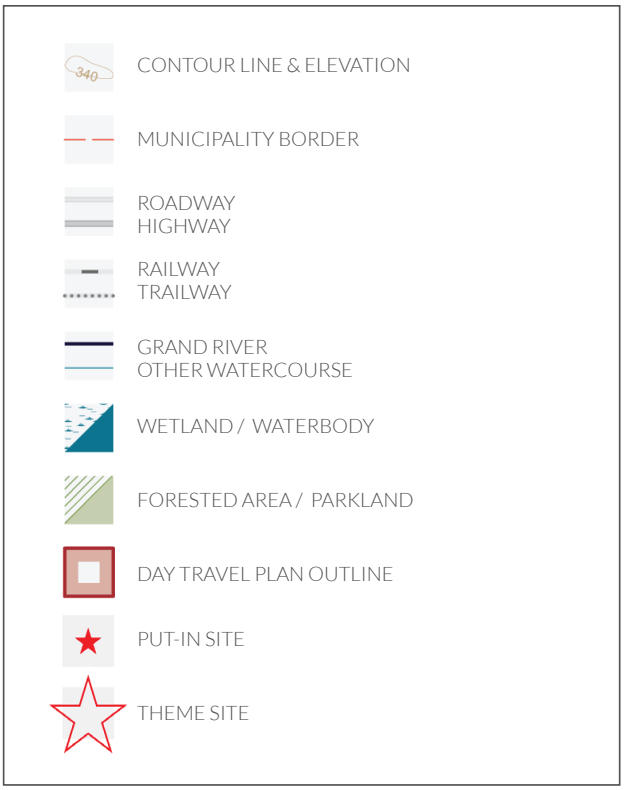
WATERCRAFT – Boating and paddling are considered two different recreational activities in the Grand River Watershed by the GRCA. Boating involves larger watercraft, generally with use of a motor, including powerboats. Boating is only permitted on the Grand River at specific Conservation Area sites and along stretches of the river outside of the scope of this guide. Paddling is permitted and encouraged across the entire river, with the option to bring your own vessel or rent one from one of several rental outfitters. Sources can be found at the back of this guidebook for further information on paddling rental outfitters.

ACCESS & CAMPING – The public parks and spaces made accessible from the river are invaluable to local and tourist populations alike, and should be cared for equally by both. Access points published in this book are made available for public use, many of which have provided parking, however, these may change over time. New construction and land development on the river is to be expected over time, and so access sites can move, or even disappear. Most land either side of the Grand River, however, is privately owned and should be treated with the same respect you would give to neighbour's backyard. **To avoid trespassing, it is important to plan out and confirm the existence of your put-in and get-out sites as well as your overnight stays in advance of starting your paddle.** To make your sleeping arrangements at a nearby campground, hotel or local bed and breakfast, it is recommended to contact the local tourism offices for up-to-date listings. Sources can be found at the back of this guidebook for further information on local tourism offices and suggestions for camping accommodation.

DAMS & PORTAGES – As you glide down the Grand River you will inevitably run into a few major and minor obstacles. Major infrastructure in the form of weirs, dams and low bridges will require your exit and reentry into the river at designated areas; this process is called *portaging*. Minor blockages, shallow *rock gardens* and built-up debris might have you stuck for a moment, or you may find your way completely blocked, where again, you will need to maneuver out of the water and around the obstacles.

Dams present one of the more dangerous obstacles on the Grand River. You may need to portage multiple 19th century low head dams and weirs depending on your chosen stretch. The undertow of these dams, called the *boil*, can be fatal to an unknowing paddler caught in its current. On the Grand River, a line of orange navigational buoys will mark the location of these dams for recreationalists during the paddling seasons, as approved by Transport Canada.[63] **It is important to be extremely cautious of these dams at all times, and especially during periods of high water.**

OVERALL MAP LEGEND



DISCLAIMER

While the information within this guidebook has been well researched by the author, the author cannot be held liable for any inaccuracies that may be present in the maps or text.

Hazards exist along the Grand River riverbanks. You are responsible for your safety. Be properly prepared!

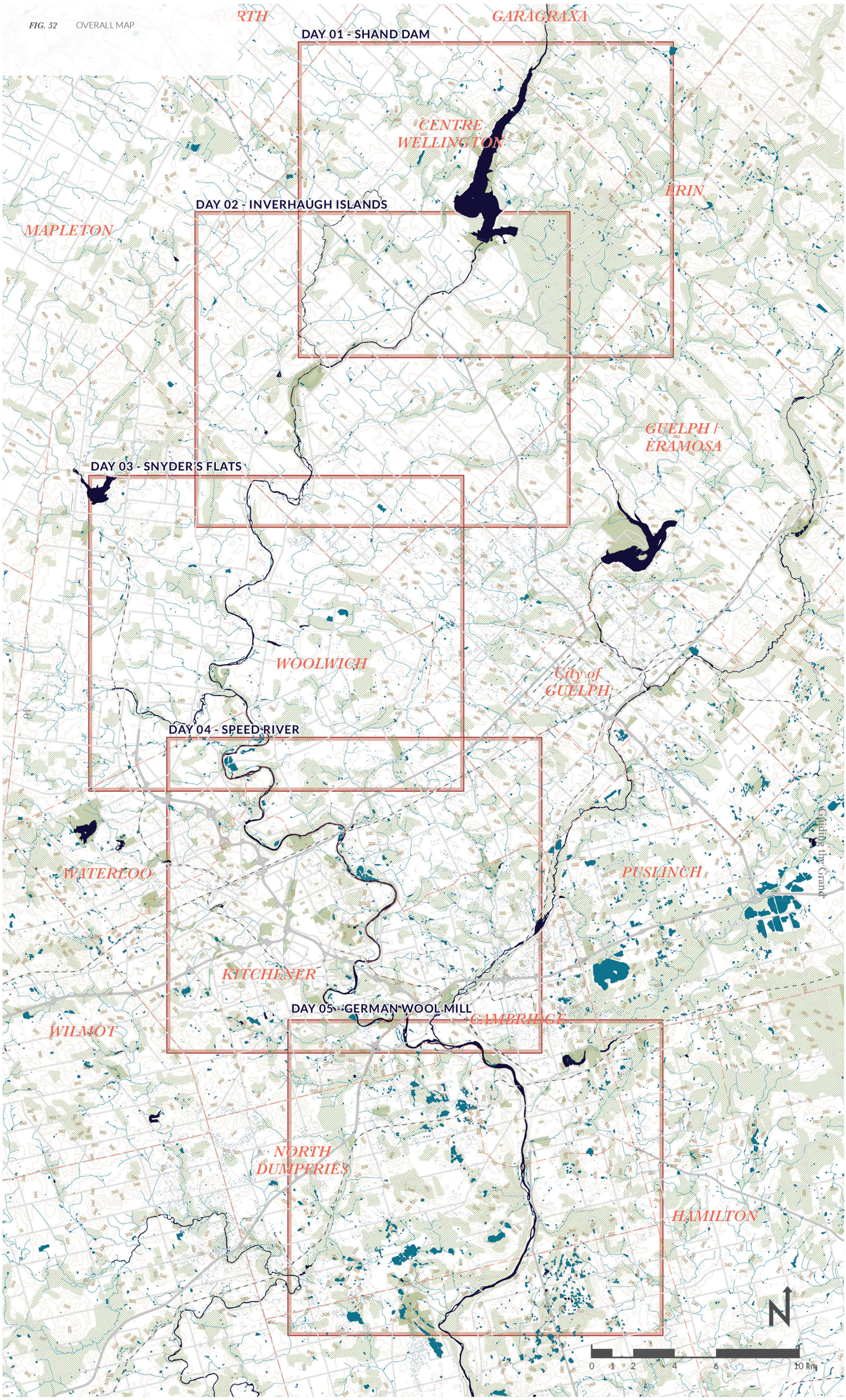


FIG. 52 OVERALL MAP

RIVER ACCESS SAFETY CHECKLIST

TO DO BEFOREHAND:

1. TRIP PLAN
- a. USE THE SAMPLE SAIL PLAN, BY TRANSPORT CANADA'S SAFE BOATING GUIDE.
- b. TELL PEOPLE YOU TRUST WHERE YOU ARE GOING AND WHEN YOU WILL BE BACK.

2. OPERATOR COMPETENCY
- a. TAKE A PADDLING INSTRUCTIONAL COURSE.
- b. HIRE A TRAINED GUIDE TO ACCOMPANY YOU ON YOUR TRIP

3. WEATHER & LOCAL HAZARDS
- a. GO ONLINE OR CALL THE GRCA FOR UPDATED WEATHER AND HAZARDOUS CONDITIONS IN THE REGION.
- b. MAKE SURE YOU ARE AWARE OF ALL LOCAL HAZARDS, WATER LEVELS AND TIDES.

4. BOAT CONDITION
- a. CHECK THE HULL FOR CRACKS OR OTHER DAMAGE.
- b. MAKE SURE THE DRAINAGE PLUG IS IN PLACE.
- c. CARRY SPARE PLUGS FOR ALL THROUGH HULL FITTINGS.
- d. MAKE SURE THE LOAD ON YOUR BOAT (GEAR AND PEOPLE) IS WELL DISTRIBUTED

TO DO FOR THE TRIP:

5. PADDLING EQUIPMENT
- a. PACK A COMPASS AND LEGAL CHART OF THE TRIP AREA FOR ADDITIONAL REFERENCE.
- b. A WATCH, TO KEEP TRACK OF TIME.
- c. KAYAK/CANOE, PADDLE (1 PER PERSON), PLUS A SPARE.
- d. BILGE PUMP, TO REMOVE WATER FROM HULL.
- e. TOWLINE, ATTACHED TO KAYAK.

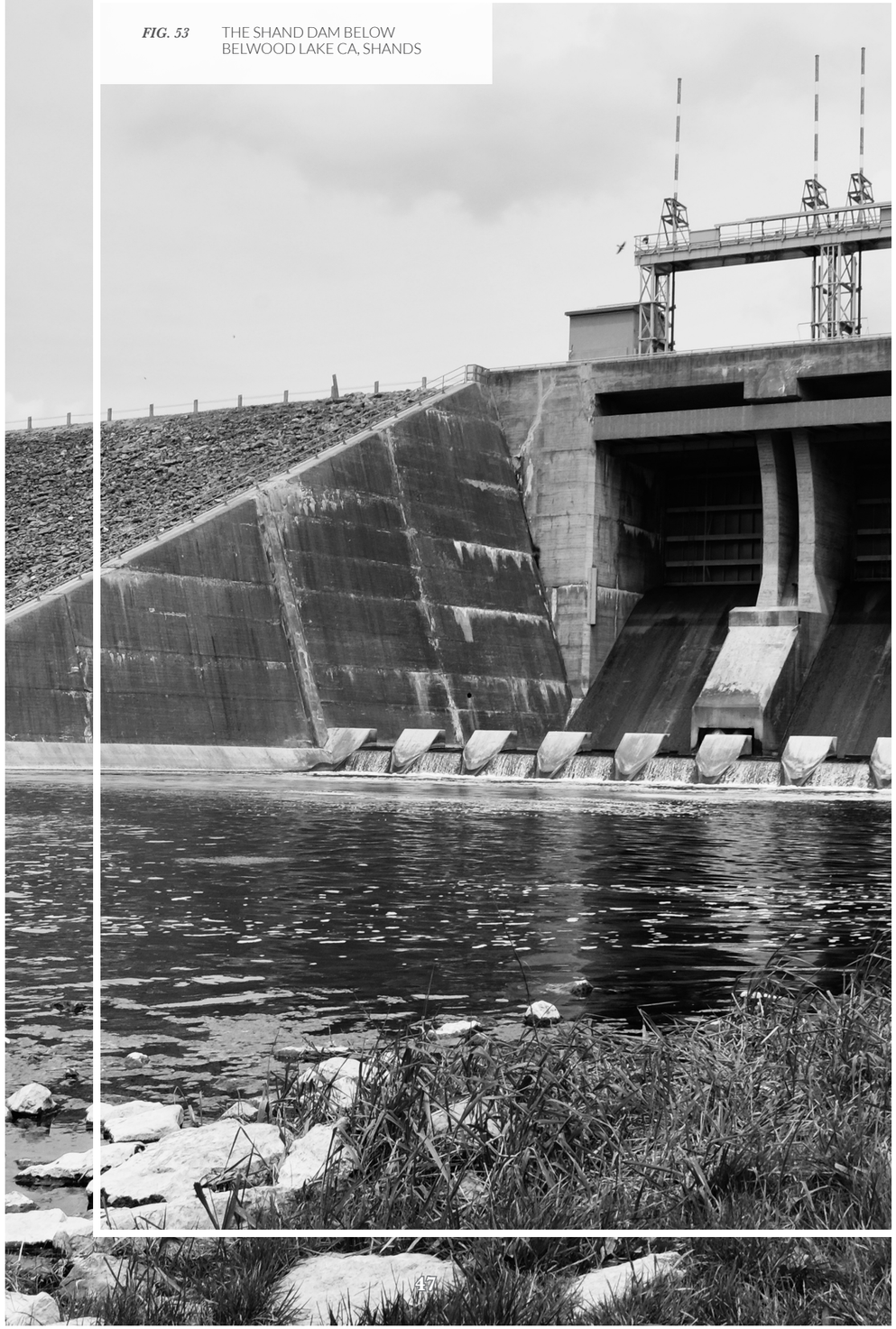
6. SAFETY EQUIPMENT
- a. A PERSONAL FLOATATION DEVICE MUST BE WORN BY EACH PADDLER.
- b. A FLASHLIGHT/HEADLAMP & SIX (6) FLARES TYPE A, B OR C (IF VESSEL EXCEEDS 6M IN LENGTH)
- c. A WHISTLE, OR SOUND SIGNALLING DEVICE.
- d. A FIRST AID KIT.
- e. NAVIGATION LIGHTS (ONLY IF OPERATED AFTER SUNSET, BEFORE SUNRISE, OR PERIODS OF FOG OR SNOW)
- f. DRY BAGS TO STORE IMPORTANT BELONGINGS IN.
- g. BOTTLED WATER FOR HYDRATION.

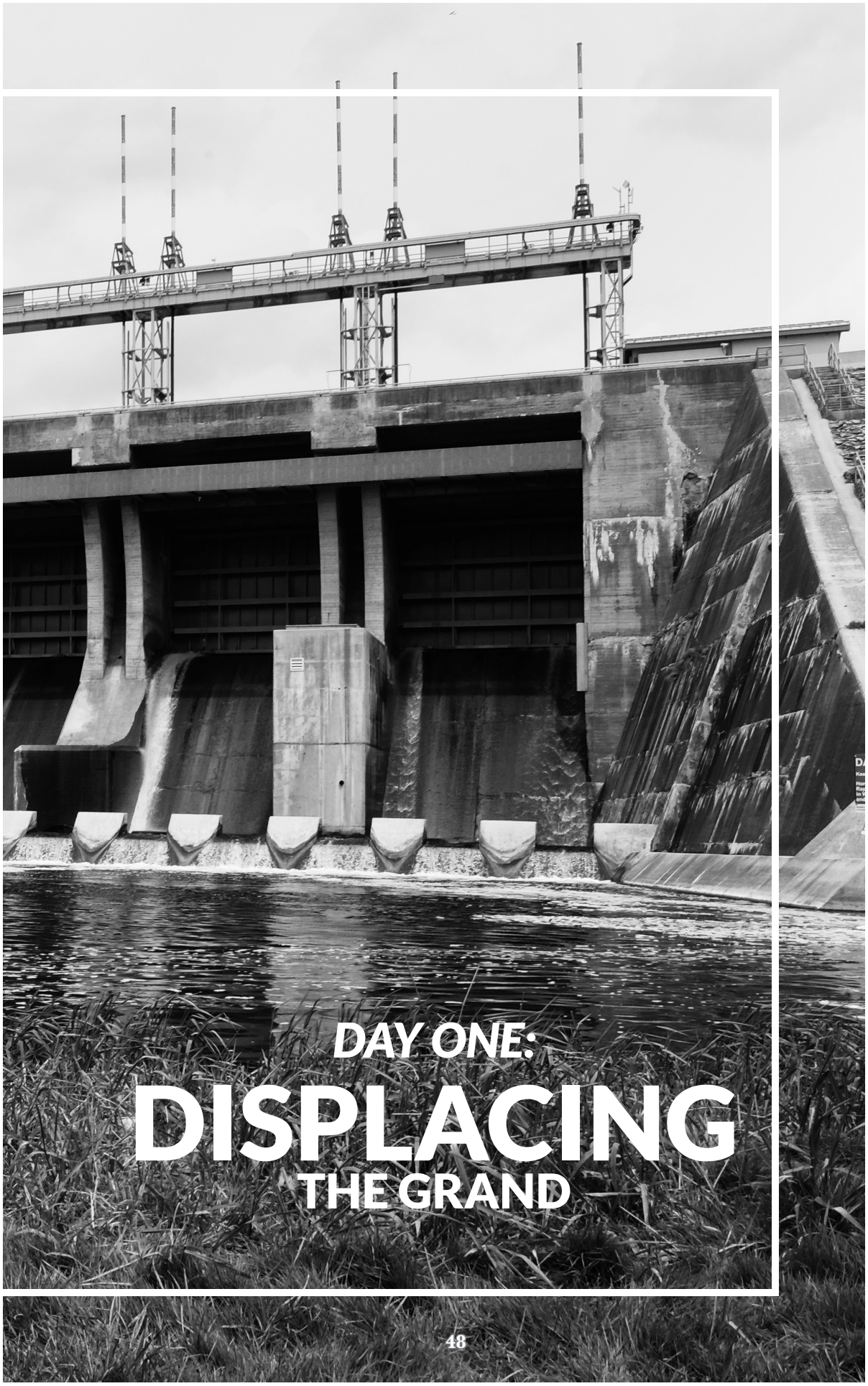
7. SAFETY BRIEFING
- a. MAKE SURE ALL EQUIPMENT IS ON BOARD, IN GOOD WORKING ORDER AND EASY TO REACH.
- b. SHOW EVERYONE WHERE YOU KEEP THE SAFETY EQUIPMENT AND EXPLAIN HOW TO USE IT.

8. OPTIONAL EQUIPMENT
- a. CAMERA, SKETCHBOOK & WRITING INSTRUMENT TO DOCUMENT YOUR TRAVELS.
- b. GPS WITH MAP FILES FOR YOUR ENTIRE TRIP.
- c. A WEATHER/VHF RADIO, FOR UP-TO-DATE LOCAL INFORMATION.
- d. PADDLE FLOAT, ATTACHED TO PADDLE TO KEEP IT FROM SINKING.
- e. PADDLE LEASH, TO KEEP PADDLE ATTACHED TO VESSEL.
- f. FLOAT BAGS, FILL THE CAVITIES OF YOUR VESSEL FOR ADDITIONAL BUOYANCY.
- g. PADDLING KNIFE, ATTACHED TO LIFEJACKET OR PDF.
- h. SPRAY SKIRT, FOR COLD WEATHER/WATER.
- i. TWO-WAY RADIOS, FOR COMMUNICATION BETWEEN MULTIPLE VESSELS.

Some additional information is provided for reference in the Index of this guidebook. For further information, see Transport Canada's *Safe Boating Guide.*

FIG. 53 THE SHAND DAM BELOW BELWOOD LAKE CA, SHANDS





DAY ONE:

DISPLACING
THE GRAND

Displacing the Grand
Overview

displace |dis'plās|
verb

[with object]take over the place, position, or role of (someone or something).
- cause (something) to move from its proper or usual place.
- (usually be displaced) force (someone) to leave their home, typically because of war, persecution, or natural disaster.
- remove (someone) from a job or position of authority against their will.

This first day's travel of Guiding the Grand focusses on the displacement of people and land over time in the Grand River Valley. The use of major infrastructure has transformed the Watershed's landscapes to serve its human populations, through major road and rail systems and their bridges, to the quarries, pits and mines of largescale industry, and most dramatically, to the dams and canals that coerce the flow of the river. This chapter discusses how the river's and its lands have been forcibly procured, parceled and settled, and the powerful ways that human settlement has altered the physical and social identities of the river.

This 7km journey down the Grand River begins and ends on waters that have been displaced by the Shand Dam, known as Belwood Lake Reservoir. The put-in site is located below the North Broadway Street Bridge, and the day ends at the base of the Shand Dam within the Belwood Lake Conservation Area. Shand Dam is celebrated as the largest and most important infrastructural development in the river's history, and is named after the family whose home it displaced in its construction between 1939 and 1942. This segment is the shortest of the six in this guidebook, with a direct travel time of 3-4 hours, including one major portage over and to the base of the Shand Dam. The site stands a remarkable fixture of water management infrastructure and human heritage within the Watershed. At the back of this chapter, a section titled *Displacing the River* explores a design intervention that, in the reservoir, uses a system of buoys to mark the original path of the river as it travelled before the construction of the dam, and below the dam, uses a system of buoys to reveal the depth of the river as it rejoins its natural course.

NEUTRAL PEOPLES DISPLACEMENT – It is difficult to imagine the full and rich histories of the Grand River and its watershed without its settlements. The small villages and towns that clustered on it over time, those that have thrived into great cities, and those that have flickered out for lack of economy. The riverbanks of the Grand River present little of the originating inhabitants, the neutral indigenous tribes of the Grand River Valley, but are plentiful in the quaint relics of early European settlement. Nevertheless, locations across the watershed have surfaced small repositories that evidence the existence of the Clovis and Archaic hunter-gatherer peoples, and eventually the Woodland cultures known for their communal longhouse shelters and crop-fed diets. These were the last inhabitants before the arrival of European influence in Norther America, and tragically these people were wiped out during the

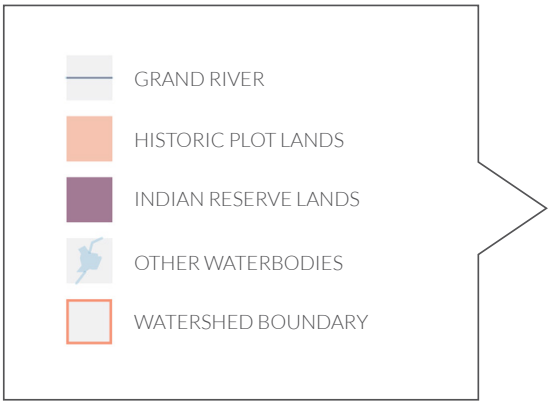
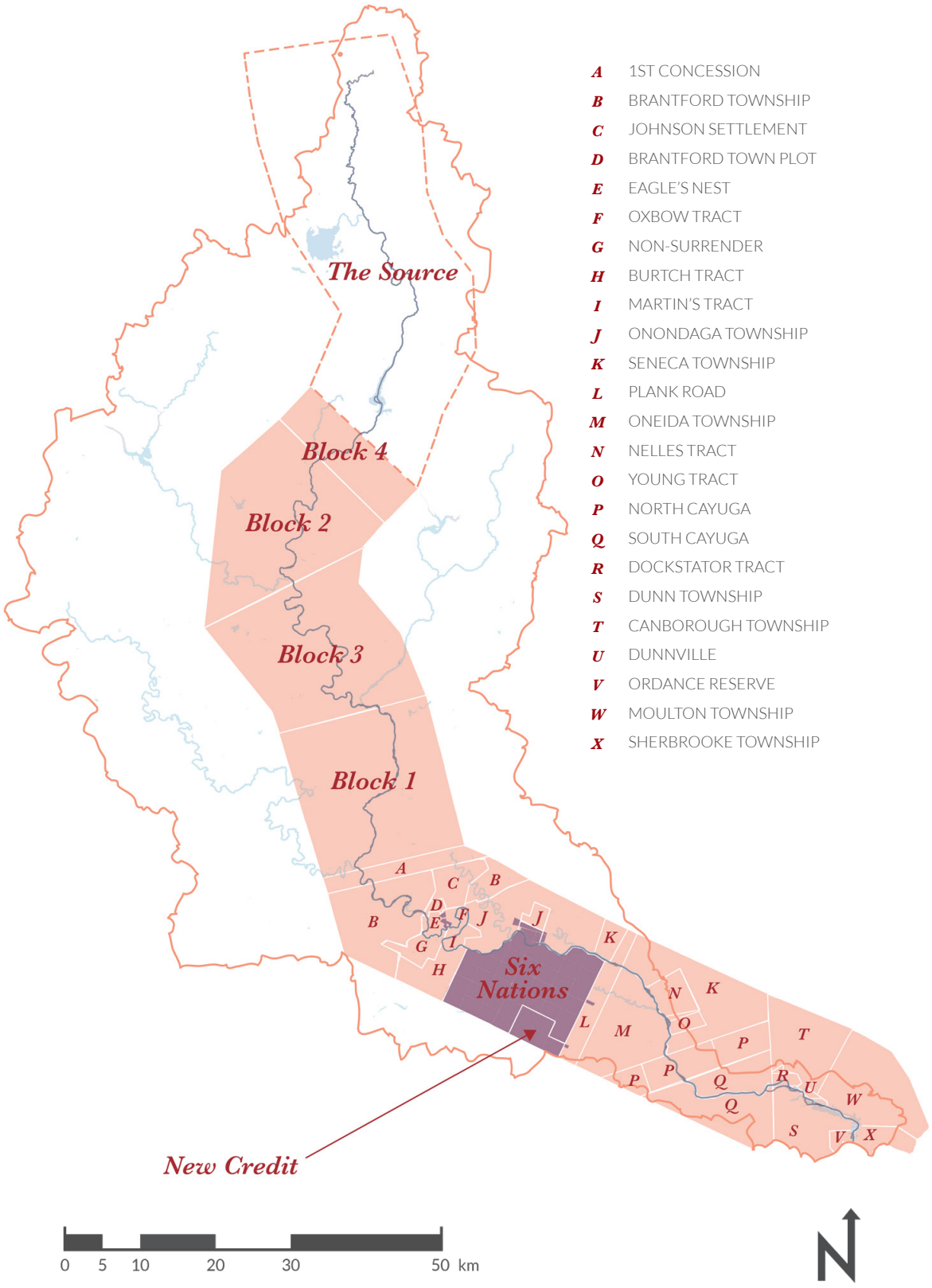


FIG. 54 GRAND RIVER WATERSHED
HALDIMAND TRACT & BLOCKS



battles between the warring Iroquois and Huron tribes. These people understood the Grand River, its wilderness and its natural heritage well enough to leave the lightest mark on its lands of any people in their near ten-thousand-year known inhabitation of them. [64]

SIX NATIONS DISPLACEMENT – Following the rise and fall of neutral indigenous life in the Grand River Watershed, the lands were largely unoccupied and used mainly as a throughway for European and indigenous travellers and traders alike. The forests were thick and wild, and deemed unhospitable to settlement by exploring Europeans.[65] The Haldimand Deed of 1784 was enacted by the Imperial British Government through negotiations with Six Nations leader Joseph Brant to repay the Mohawk peoples of New York for their lost Mohawk Valley.[66] It granted them "six miles deep from each side of the River beginning at Lake Erie and extending in that proportion to that head of the said River which them and their posterity are to enjoy forever"[67]. Soon thereafter, Brant began to section off parcels of land for sale, or else 999-year leases, to individuals interested in developing the vast amount of land.[68] By 1793, a new grant called the Simcoe Deed expropriated some valuable lands near the mouth of the river, foreshadowing the method by which the indigenous Six Nations would lose nearly all of their rightfully owned lands. Loyal Imperialists seeking lands north of the United States founded new settlements through the generosity of Brant and his people, and soon after came large groups of Europeans seeking new life after war, famine and political turmoil.

EUROPEAN SETTLEMENT – The Grand River Watershed experienced population growth consistently following the conclusions of the War of 1812 and the Napoleonic Wars in 1815, steadily increasing into the 20th century. Escaping religious persecution, disease, and conflict, waves of European settlers of mostly Scottish, Irish, English, and German origin, settled in the blocks of land Brant had drawn and sold, and named their new settlements after places from their homeland: Fergus, Elora and Galt are celebrated Scottish settlements, the Kitchener-Waterloo area, originally named Berlin, was settled by Germans.[69] The block owners, who were initially unable to meet their payments to the Mohawks, began to withhold payments altogether as economies grew and time wore on. Effectively, the European notion of land ownership was employed against Brant and his people, resulting in the loss of a large amount of their lands, and any profits related to them ongoing to this day.

After the large-scale settlement of the Grand River Watershed, much of its natural heritage was lost to make room for increasing amounts of development. Trees were cleared, and natural wetlands drained in order to transform the land into crops. A report on the condition of the Grand River in the 1860's and 1870's states that the Grand River and its surrounding environment were universally understood as exploitable resources, with no regulations in place to protect it.[70] In the meantime, townships and villages grew into cities and municipalities, each with separate economic concerns, none of which took the overall health of the Grand River into account.

FLOODING & DROUGHT – Within the first half-century of significant urban settlement in the Grand River Valley, the landscape had been displaced to the point of irreversible damage. Forests were cut down to build towns and cities, lands were paved over for convenient transportation, wetlands were drained to make room for crops, and of course, rivers and streams were dammed and channelized for the milling industry, and as a result, the watershed lost a great deal of its absorbent vegetative land cover and passive water management. This meant that the valley's springtime meltwaters travelled faster and in much greater quantities leaving the river completely dry by the summer months. Damages caused by flooding in the newfound towns and villages of the southern watershed quickly became a priority in the survival of settlement on the Grand River.

RIVER CONTROL – Following the devastating floods in the first part of the twentieth century, municipalities of the Grand River Watershed were divided on the pressing need for change.

Towns to the north were little affected by the flooding and drought issues, but the greatest economies within the watershed were those places hardest hit by both disasters. Especially because of the lack of regular flow, the water quality of the river reached unlivable levels of excrement and industrial pollution. In order for the Grand River to regain any semblance of health, the municipalities of the watershed needed to band together and act collectively.

The Grand River Conservation Authority (GRCA) was born of this need, however it was only achieved through provincial legislature, as the municipalities of the Grand River were ultimately unable to afford the costs of largescale water management alone. Seeking to uphold common goals for all citizens of the watershed, the GRCA worked to devise a plan to protect against further flood with a plan for a reservoir system, that would pool excess waters before they became unwieldy, and to release that stored water over the course of dry spells to avoid the condition of drought. Plans were made, and a site chosen north of Fergus for the first largescale dam to be built on the Grand River: The Shand Dam.

FIG. 55 PORTAGE OVER SHAND DAM FROM BELWOOD LAKE RESERVOIR

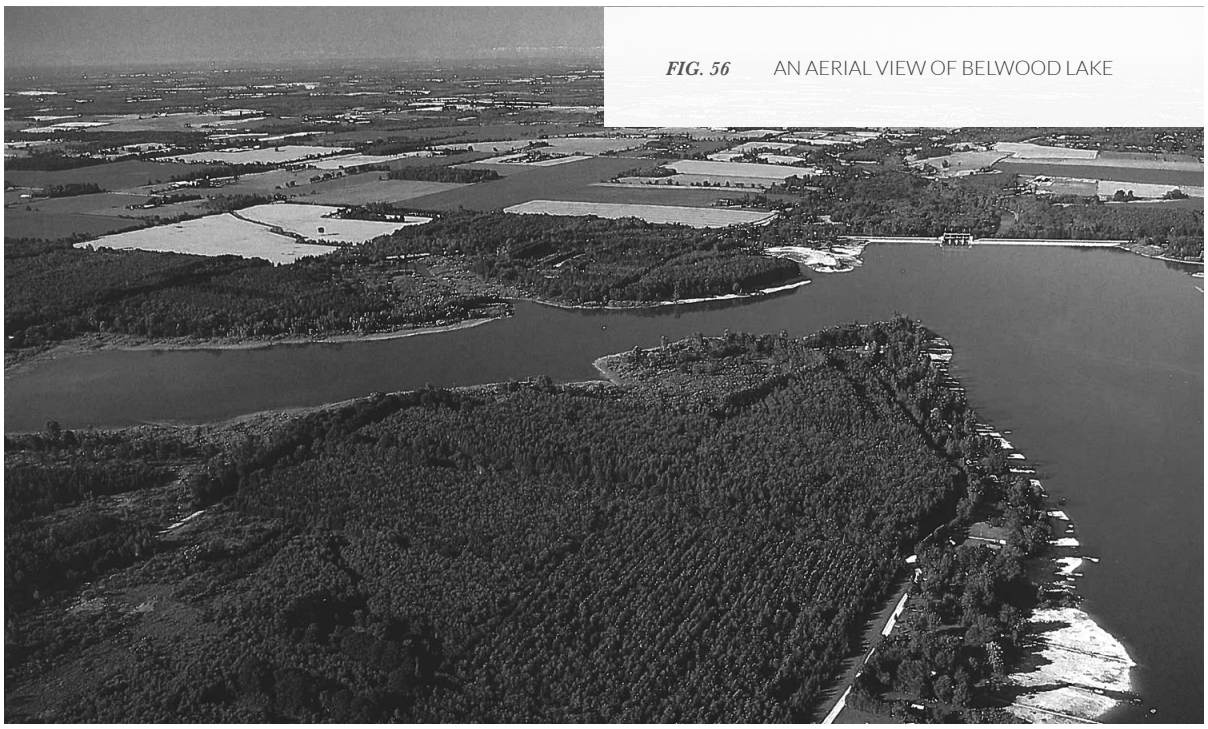
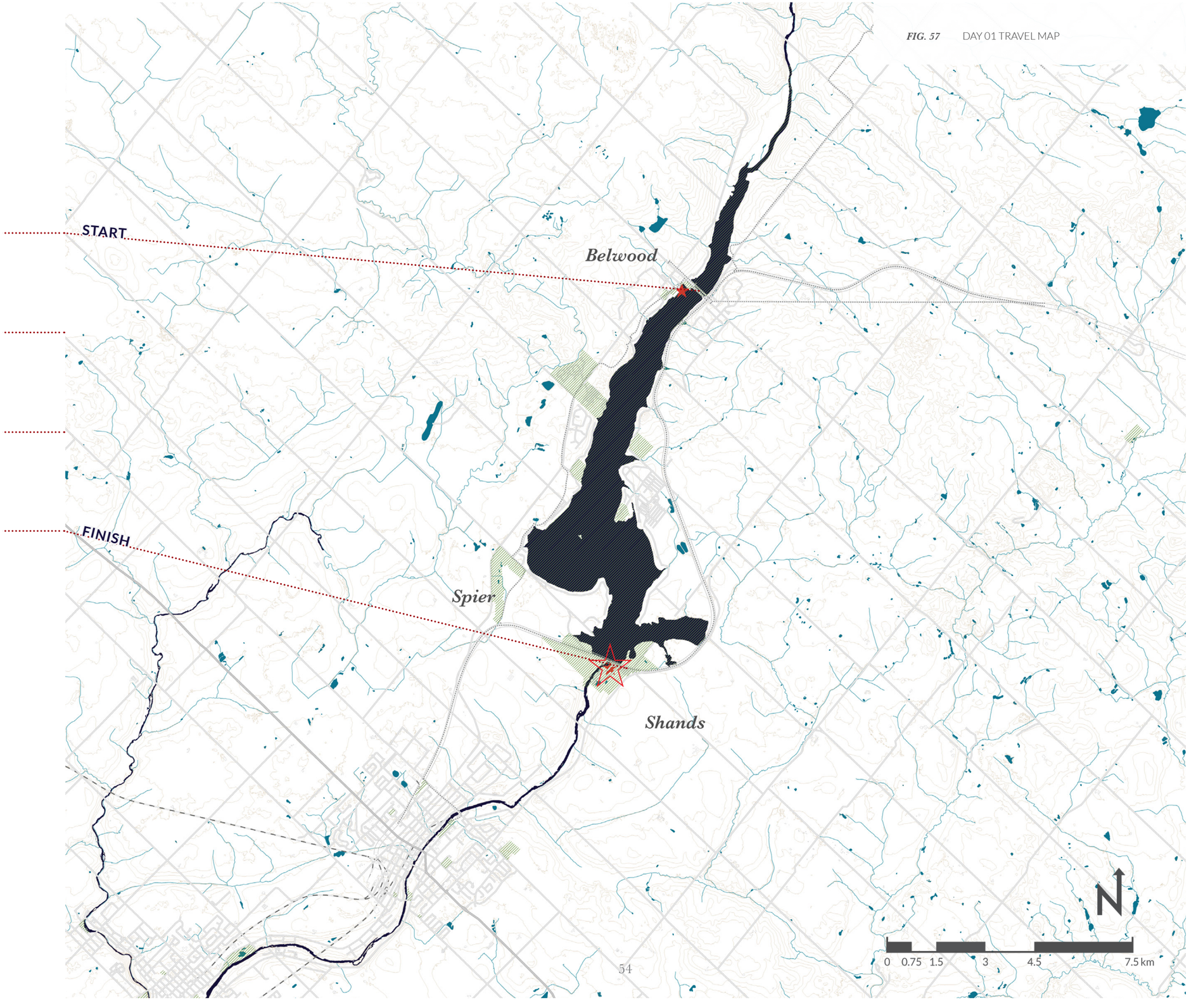


FIG. 56 AN AERIAL VIEW OF BELWOOD LAKE

Displacing the Grand
Timeline & Maps

Trip Hours	*Map Number*	*Activities*	*Place & Point-of-Interest*
0	01		BELWOOD
			N BROADWAY ST BRG
+1	02		HIGHLAND PINES CAMPGROUND
	03		CAMP NOKOMIS
			BELWOOD LAKE SAILING CLUB
+2	04		SPIER
	05		CAMP BELWOOD, YMCA
			SHANDS
+3	06		BELWOOD LAKE CA
	07		SHAND DAM

FIG. 57 DAY 01 TRAVEL MAP



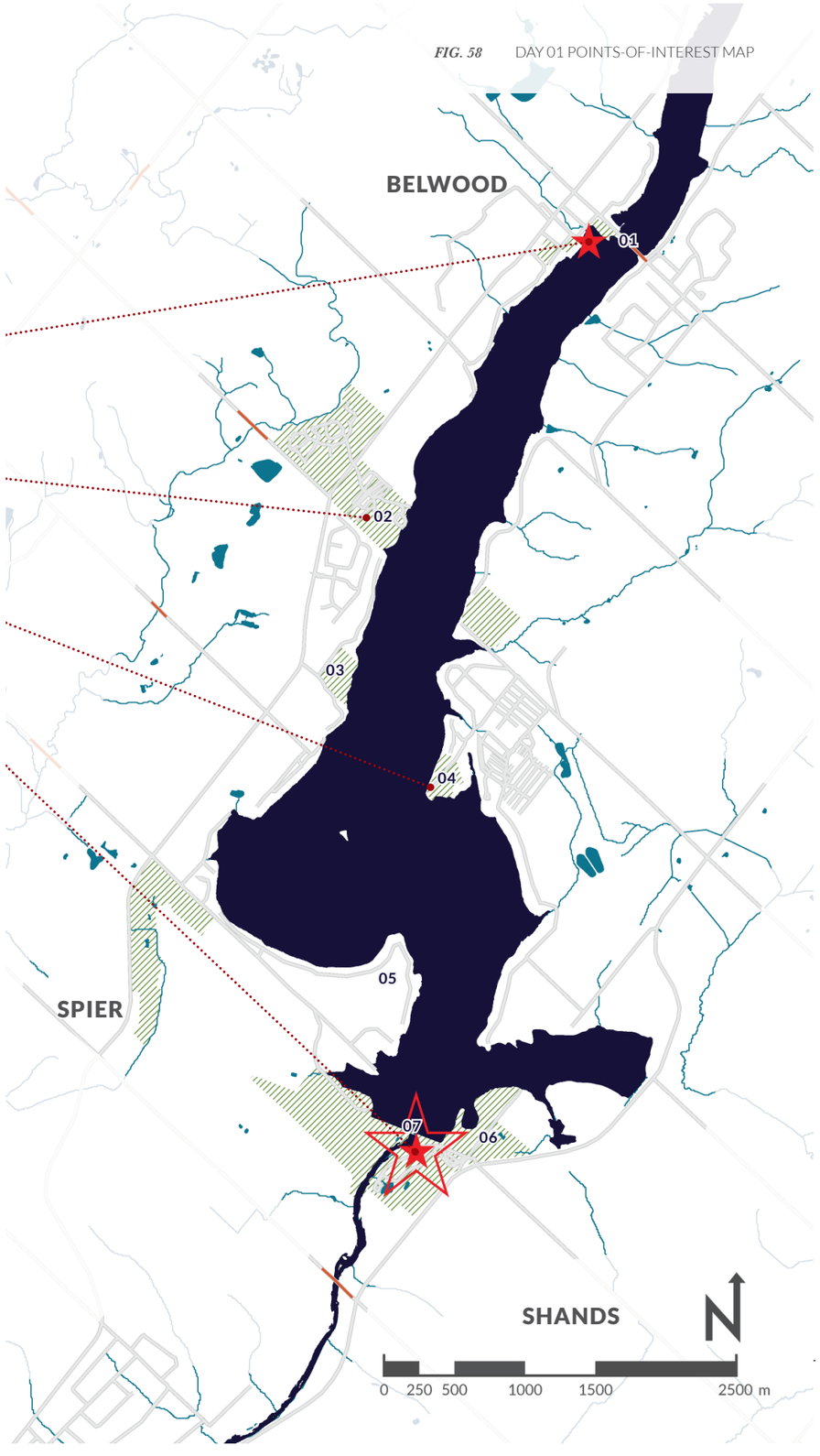


FIG. 58 DAY 01 POINTS-OF-INTEREST MAP

DAY 01 - Displacing the Grand

Shand Dam & Belwood Lake CA

Imagine, when you walk along that segment of railtrail which passes over the Shand Dam, that you straddle a defining element of the surrounding landscapes; its massive concrete form was cast to pool the waters of the reservoir and release them in a trickle or a torrent, as needed to balance threats of flood and drought. As the largest river in southern Ontario, the Grand River is a formidable body to conceive in its entirety. One of the first official acts for the GRCC was to construct the Shand Dam, begun in 1939 and completed in 1942, effectively submitting the Grand River to an act of displacement that, to this day, contributes to the survival of downriver towns and villages. The construction of the dam set a new standard for the Grand River and rivers across Canada, being the first of its kind implemented explicitly for the purposes of water management and flood control.

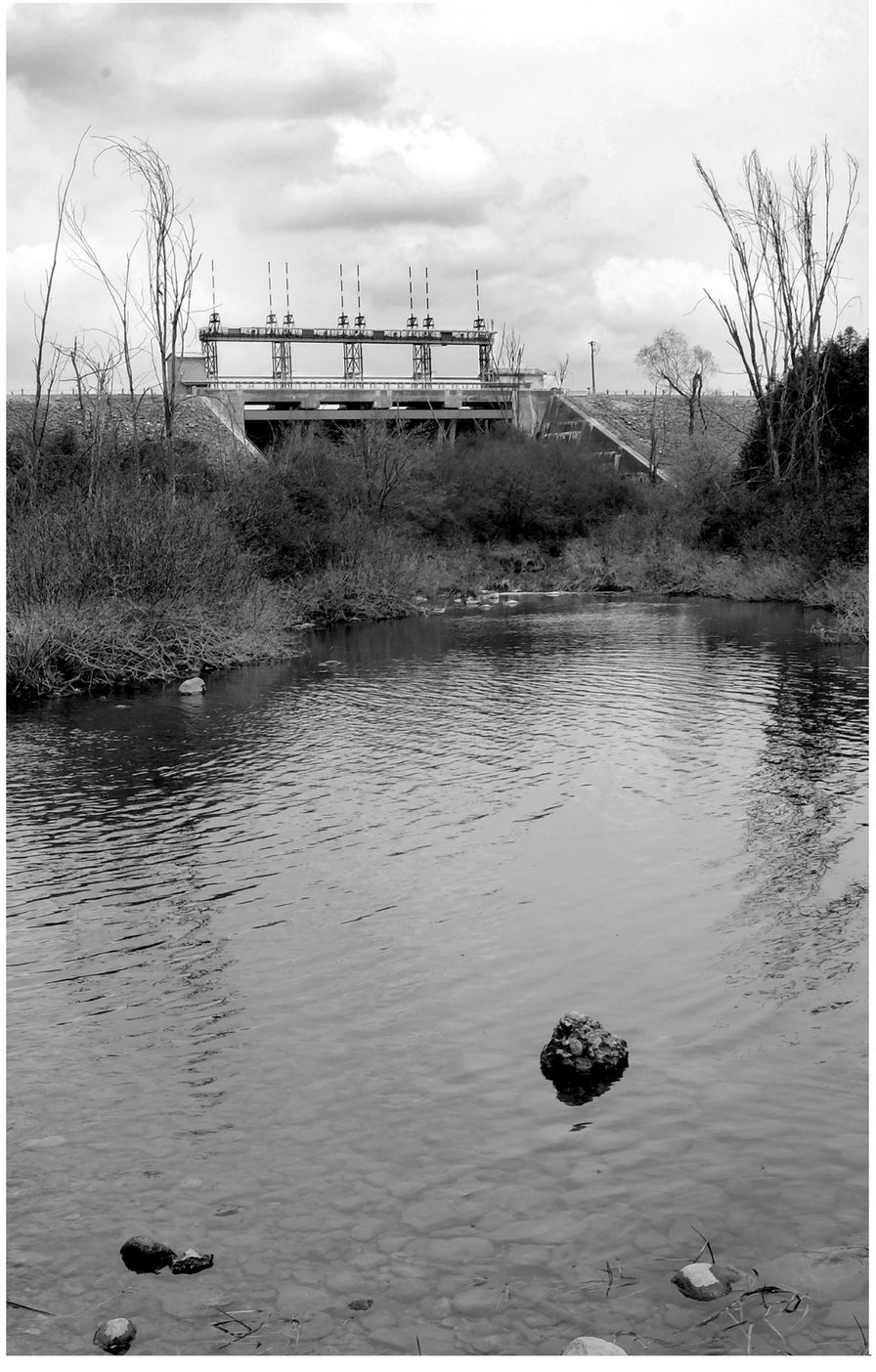
Belwood Lake is formed by the retention of the Grand River's waters, held back by the Shand Dam at its southernmost point. The dam, the first of seven largescale dams within the watershed, was built between 1939 and 1942 by the newly formed Grand River Conservation Commission (GRCC) as a means of displacing the river's flow for the management after major flooding and drought issues that arose during the early 1900's. The construction of the dam is a keystone event for the Grand River with relation to human settlement, and stands an impressive embodiment of the efforts in water management within the watershed.

Three sites were originally discussed for the construction of the Shand Dam, the current site selected for its promising rock formation. The dam itself is constructed 25.9 metres high from reinforced concrete anchored nearly 4 metres into the Grand River bedrock, with its wing walls capped with clay fill. In order to supply the materials needed for the project, a concrete mixing plant was erected on the site, with pumps directed to all parts of the site. Additionally, sand and gravel were supplied by a pit developed for the project upstream of the dam.[71]

The Shand Dam Reservoir, called Lake Belwood, is 12km in length with a capacity to store 64 million cubic meteres of water. The original proposal for the Shand Dam was made in the early 1900's, complete with plans for an electric power generating system. At the time, the waters of the Grand River were deemed too sporadic for reliable electrical generation, but in 1989 the GRCA had a turbine for electrical power installed, providing consistent energy enough to power 500 homes.[72] Working together with the Conestogo Dam on the Conestogo River, the Shand Dam controls river levels in the cities and vilalges of Kitchener, Cambridge, Paris, Brantford, Caledonia, Cayuga and Dunville.[73]

FIG. 59 DAY 01 EXISTING SITE MAP

FIG. 60 THE GRAND RIVER & SHAND DAM



Displacing the River

DISPLACING THE RIVER – In order to reveal aspects of the natural, political and cultural histories at this site, while respecting the strong physical presence and functions of the Shand Dam and its reservoir, a subtle use of design is implemented. Buoys are a known icon of aquatic navigation, commonly used on waterbodies with frequent boat traffic. They mark hazards and are used to allow vessels to moor temporarily to their anchored chains. In this proposal, buoys are used in two different ways: first, at the reservoir, as a visual cue to the original path of the Grand River, before its waters were pooled by the dam; and second, below the dam, as coloured system indicating safe, hazardous, and unsafe water depths for paddling.

The buoys are used as elements of access, and are reintroduced across the remaining four sites in *Guiding the Grand* to announce the presence of a theme site to arriving paddlers, and to, again, reveal the relative water levels of safety for entry at any given time. These buoys do not, however, reveal information pertaining to the speed of the river water, and as such, it is encouraged that any trip on the Grand River follow a Checklist for Safe River Access located at the end of this chapter.

A DISPLACING THE RIVER - RIVER TRAIL
B PORTAGE ACCESS
C PUT-IN ACCESS
D DISPLACING THE RIVER - SPILLWAY POOL
E SHAND DAM
F ELORA -CATARACT TRAILWAY
G SHAND DAM SPILLWAY

EXISTING PROPOSED

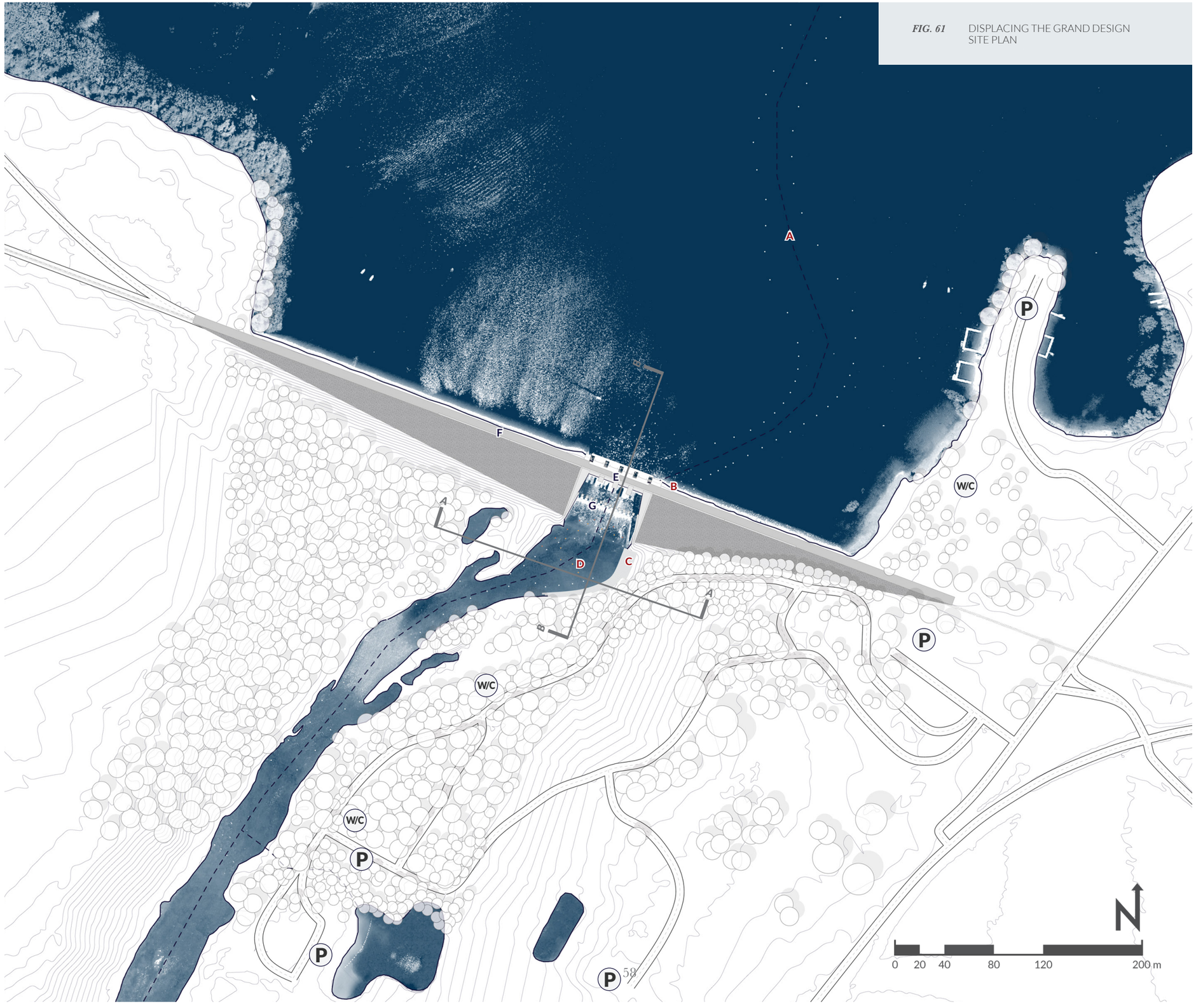


FIG. 61 DISPLACING THE GRAND DESIGN
SITE PLAN

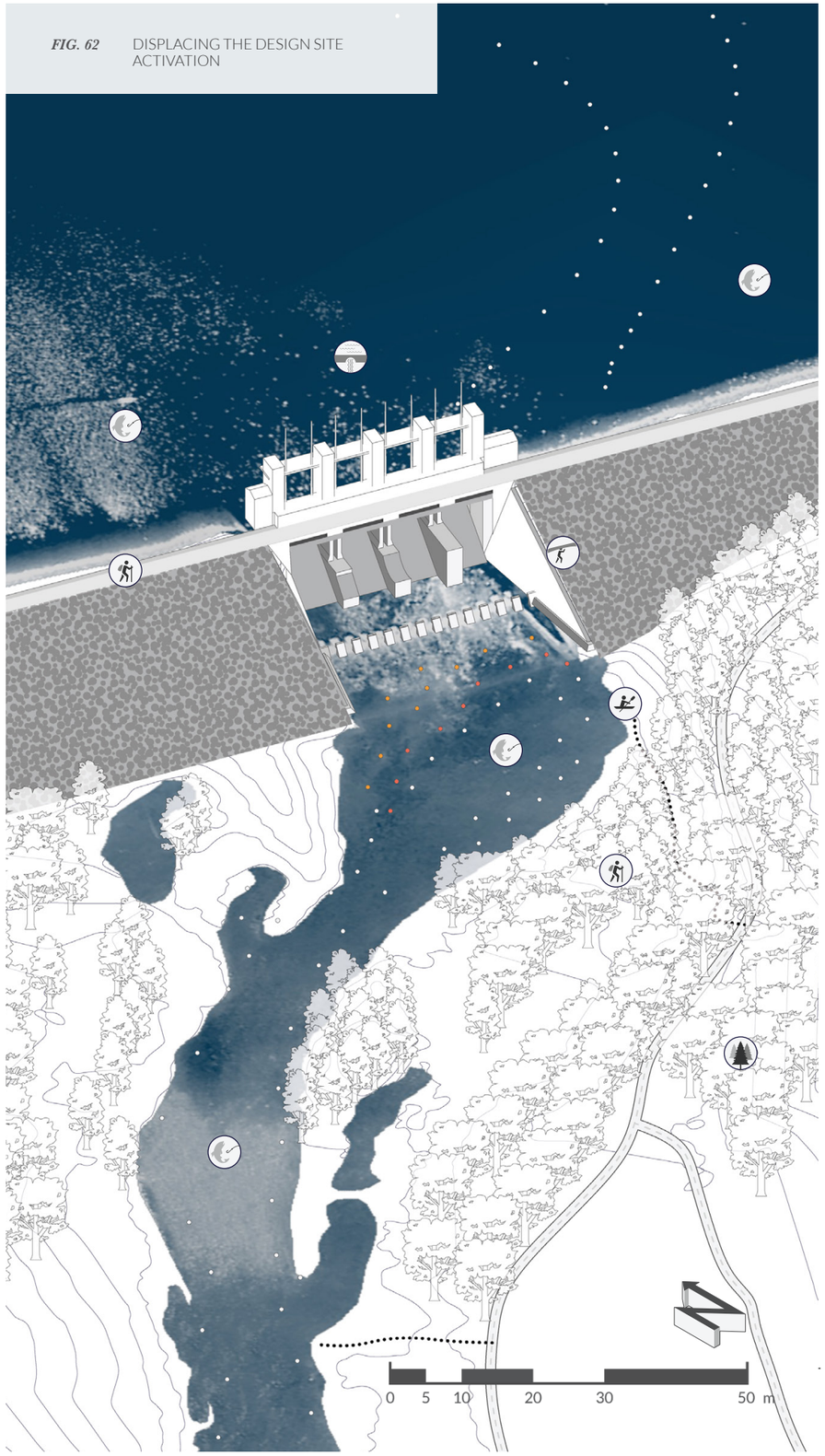


FIG. 62 DISPLACING THE DESIGN SITE ACTIVATION

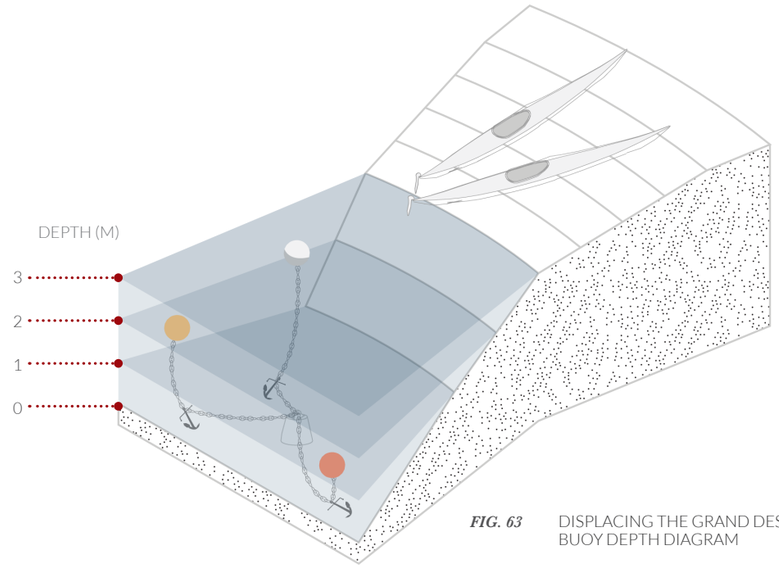


FIG. 63 DISPLACING THE GRAND DESIGN BUOY DEPTH DIAGRAM

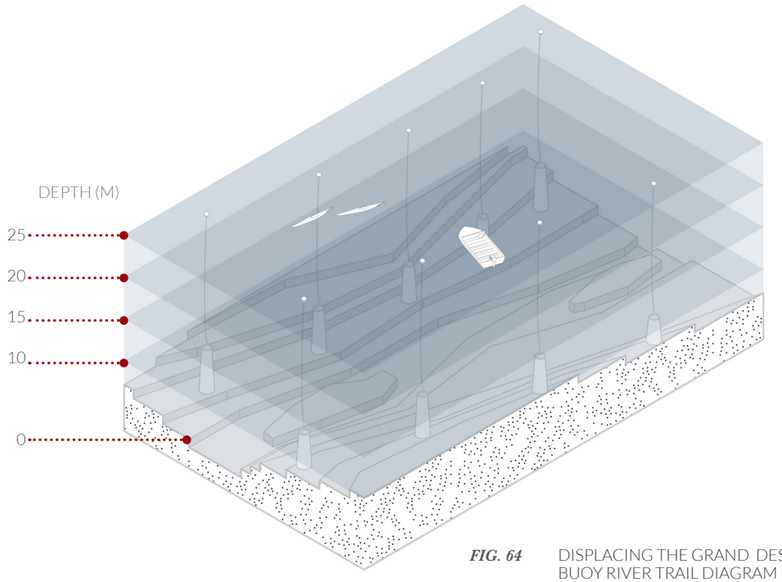


FIG. 64 DISPLACING THE GRAND DESIGN BUOY RIVER TRAIL DIAGRAM

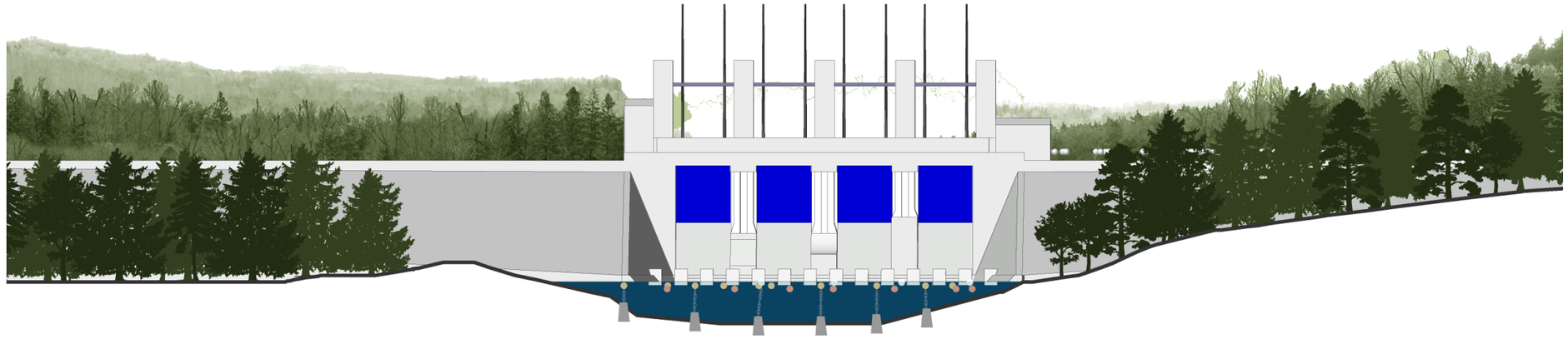


FIG. 65 DISPLACING THE GRAND SECTION AA - DAM ELEVATION

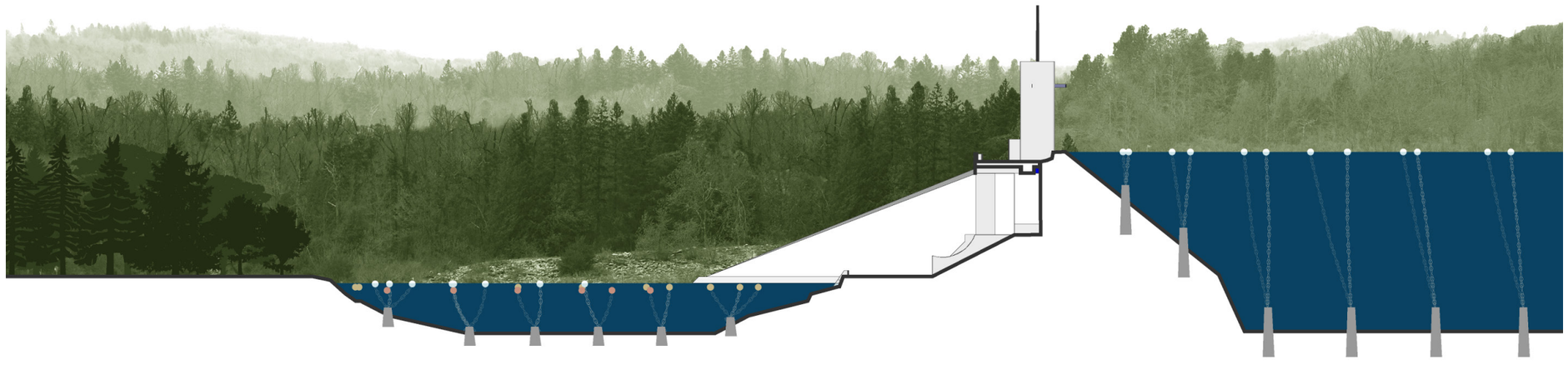
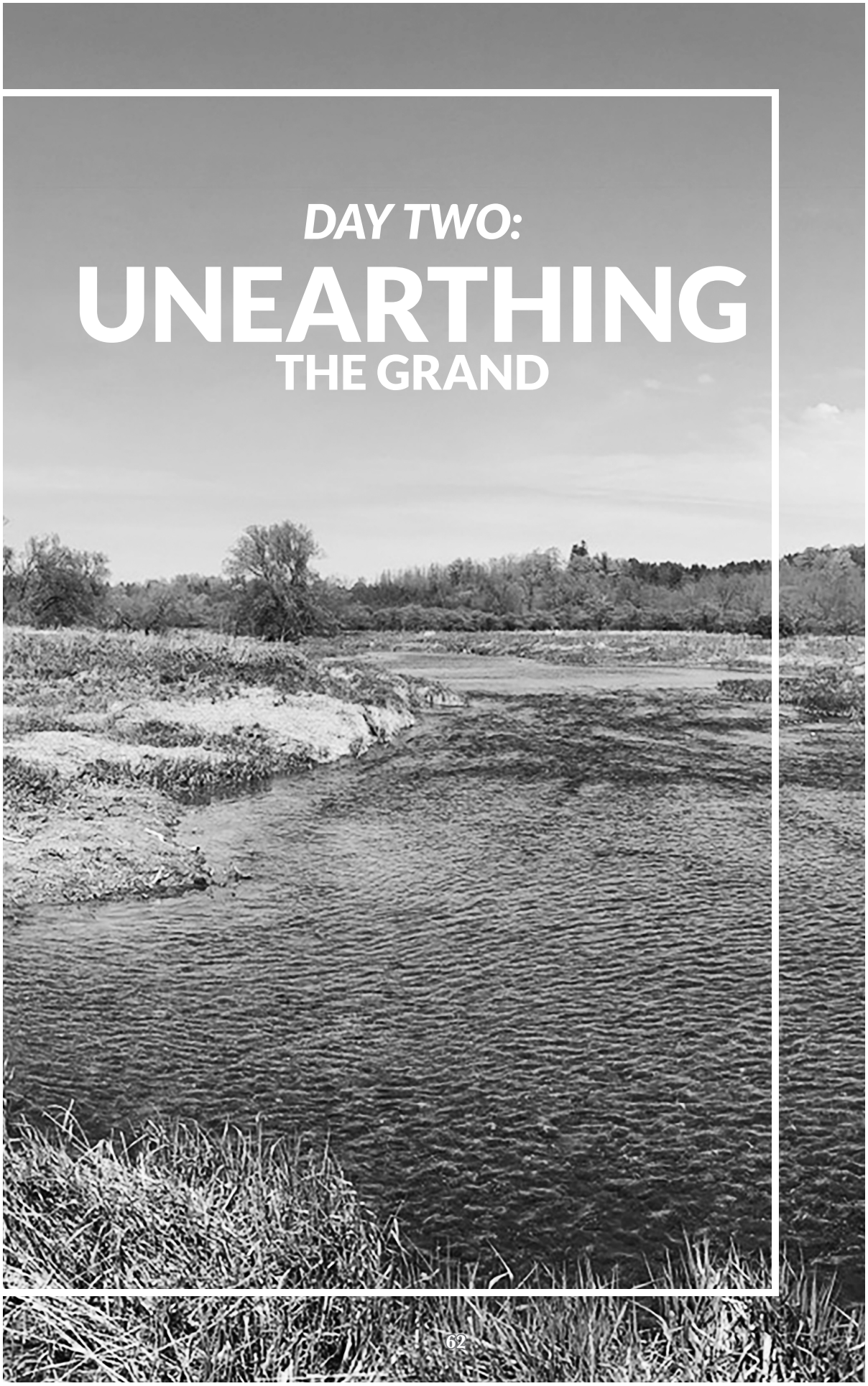


FIG. 66 DISPLACING THE GRAND SECTION BB THROUGH DAM

FIG. 67 DISPLACING THE GRAND VIEW
BELOW DAM

FIG. 68 DISPLACING THE GRAND VIEW
ACROSS RESERVOIR

FIG. 69 THE GRAND RIVER AMONG
BRAIDED ISLANDS AT INVERHAUGH



DAY TWO:

UNEARTHING
THE GRAND

Unearthing the Grand
Overview

unearth |ˌənˈərTH|
verb

[with object]find (something) in the ground by digging.
- discover (something hidden, lost, or kept secret) by investigation or searching.

This chapter of Guiding the Grand focuses on the physical landscapes of the Watershed; what its natural regions are, how they were formed, and their present state in relation to the human and wild occupation of them. This section will take you from the bare rock of its geological foundations, through the rich gravel, clay and silt deposits left by glaciers of the region, toward its lush vegetative cover and the resultant wealth of its agricultural industry.

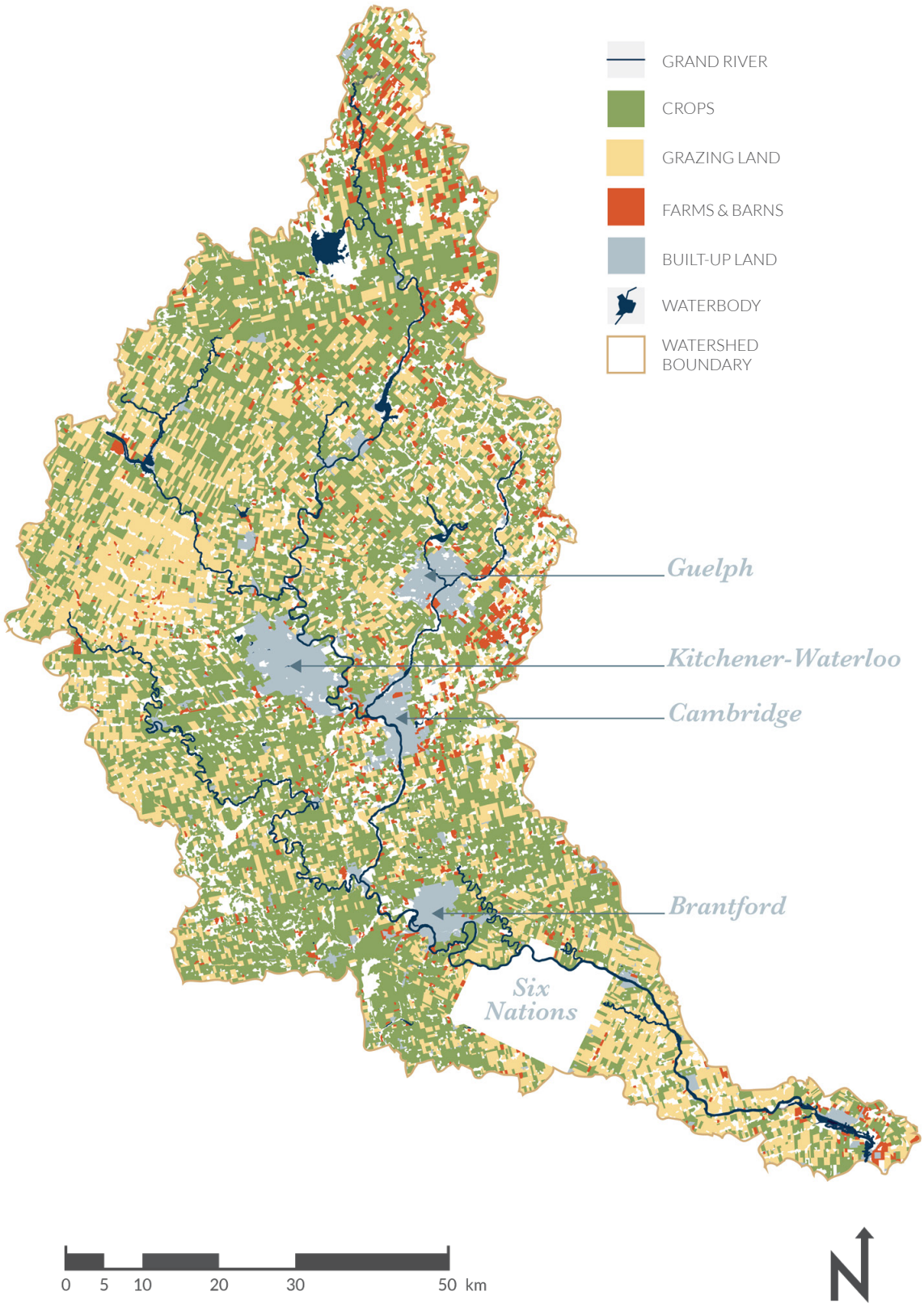
This journey is the most physically challenging in this guide, with frequent and necessary portage stints, totalling 1,200m of carrying your boat and belongings over land. You will arrive at the end of this 19km journey and chapter at the site of the *Braided Islands of Inverhaugh*, a remarkable network of river islets that the Grand River has woven itself through over time, saturating the soils of meadows, grasslands, and wetlands all contained within the area. The nearby Riverbound Farms, located northwest of the 8th Line Bridge that bisects the site, provides an excellent developed counterpart to the natural heritage of the area, with significant crop lands and livestock to evidence the largest occupational industry within the Grand River Watershed; Agriculture.

GEOLOGIC DEVELOPMENT – The geologic development of the area occurred well before the presence of humankind in the Watershed, and as such, we are only able to fathom its events through the layers of rock and fossils created over time. The Grand River Watershed is composed of several layers of rock and soil, formed and deposited over hundreds of thousands of years. The stretch of the Grand River that travels down from Shand Dam, bisecting the towns of Fergus and Elora, and through the Elora Gorge reveals the diversity in the Grand Watershed's glacial formation. Below the textured surface of the Grand River Watershed's three landforms lie ancient foundations in bedrock, compressed by the deep ancient seas of the Silurian and Devonian periods. The bedrock is composed of sedimentary limestone, dolomite and dolostones, eroded by waters, and broken down by natural forces over the Paleozoic, Mesozoic and Tertiary periods. It is in the Quaternary, and present period that glaciers began their activity in forming the lands of the contemporary Grand River Watershed.[74] Take a closer look when you come across bare rock – it can reveal eons of history!

LANDFORMS – The Grand River Watershed contains three unique landforms that all formed over the course of millennia up until about 11,000 years before present, when human life arrived in the valley. Three unique formations characterize the watershed lands: the low, undulating till plains to the north; the uneven, rolling lands striped with moraine ridges in the central region; and the flattened lake plains to the south. The advance and retreat of massive glaciers over southern Ontario between the courses of many ice ages sculpted the northern and central landscapes, grinding the earth into the rich silt deposits of clay and rock that are now found scattered throughout the valley. Meltwaters from the glaciers created ridged spillways that led to massive lakes to in the south, the weight of the waters pressing the land flat. [75]

The northern till plains are low and poorly drained, due to the non-porous clay deposits that flow through them. The Luther Marsh, located about 20 kilometres north of Belwood Lake, is an example of the pooling of water over these clay plains. Even still, farming persists as the overwhelming land use in this region, with a greater number of barns than anywhere in the

FIG. 70 GRAND RIVER WATERSHED AGRICULTURAL INDUSTRY



Watershed. The central moraines are notably persistent on either side, north-south of the 401 Trans-Canada Highway as uneven, rolling hills crossed by ridges, called recessional or terminal moraines. Moraines in this region are associated with the material collected and ground up at the edges of moving glaciers, and generally contain rich deposits of gravel and sand. The ridged landscapes provide sheltered pockets for wildlife to thrive, but are threatened by extraction and mining industries. The southern lake plains left sandy shorelines near Brantford, while further south flat clay plains were developed beneath great depths of meltwater from glaciers that has since drained away.[76]

Here, early on in *Guiding the Grand*, is a great opportunity to begin to look out for particular land conditions known to exist in the Grand River Watershed, in addition to the till plains, moraines and lake plains:

Drumlins are large whale-shaped landforms, understood to be the result of a glacier advancing a second time over a previously deposited mound of material

Eskers are thought to be the collecting of sediment as a river passes through or beneath an ice sheet, resulting in a long narrow formation

Kames take the form of cones or mounds of glacial material, formed as streams travelled over the edge of a glacier in its recession[77]

Kettles are the result of large masses of ice falling off a glacier and being covered over with debris, so that when the ice melts away, a hollow is left to collapse into a steep basin – if that basin fills with groundwater, it is called a *Kettle Lake*

Till Plains are the result of varied deposits of clay, sand and soil as they are dragged across land by glaciers, and are often poorly drained due to the impermeability of their composition[78]

VEGETATIVE COVER – Two predominant zones for plant and animal life define the Grand River Watershed: to the north, the mixed evergreen and deciduous forest of the north; and the southern Carolinian Forest, so named as it is common south through to the Carolinas of the United States. The boundary between the forests is not a hard one, and the notable change exists parallel to Highway 401. The northern forests contain a great abundance in variety, and the wide-ranging species of maple and beech prevail in both forest types, while the white pine is known to have travelled through the watershed by way of fire. First Nations people favoured the white pine, and would often burn its wood to clear land for farming, for driving deer and for signaling over distances – the fire's smoke would then help to pollinate new growth dispersed by wind. The Carolinian Forest is not common in Canada, and is distinguished by species like oak, hickory, tulip, sassafras, and distinctive shrubs like the flowering dogwood.[79]

AGRICULTURE– Farming remains the most steadfast of industries practiced in the Grand River Watershed. It is known that the earliest settlements of indigenous tribes fed their villages off of crops of squash, beans and corn[80]. The settlement of the Grand River Watershed began with the felling of trees and the ploughing of fertile soils, where novice and expert farmers alike worked for their livelihood and futures, and whose descendants maintain as a worthy vocation forward to this day.

> *There is no country in all the world where the soil is more fertile or well-watered, where the air is clearer or the skies sunnier. Upper Canada was manifestly created by nature to be a farmer's paradise.*[81] – Mabel Dunham

The expert agricultural practices that the Grand River has become known for were originally brought up from Pennsylvania by the Mennonite pioneers of early settlement. They brought with them the most advanced tools and techniques of their time, travelling through the Grand River Valley by wagon, deliberating carefully on which lands would become their new home and planting grounds. Empire loyalists and other European settlers were not equipped with the same degree of agricultural knowledge, nor the hardened will and moral fibre of their religious lifestyle, and so the Mennonite populations grew very successful in

their occupation. Their crops became sought after with local open markets organized in Kitchener and Waterloo to sell their produce and wares to travellers from afar[82]. Early on, focus was placed on the growing of subsistence crops and commercial crops in grain, for sales across Norther America[83] . These members of the Grand River Valley are integral to its cultural history, and contribute hugely to the physical identity of the Watershed.

GRAND RIVER SPECIES – Though the Grand River has lost many of its indigenous habitats through the displacement initiated by European settlements, it has managed to regain a significant amount of its wild environments through conservation efforts, including much of its native flora and fauna. The stretch of river between Shand Dam and the braided islands of Inverhaugh reveals an incredible crossover of both Carolinian and Deciduous-Pine Forest the Grand River watershed is famed for. You will need to portage over the dams in Elora.

The following are a list of species known to be common throughout the Grand River Watershed:

Birds: Waterfowl, Kingfishers, Red-tail Hawks, Turkey Cultures, Bald Eagle, Great Blue Heron, Various songbird varieties
Fish: Carp, Sucker fish, Catfish, Large and small mouthed bass, Coho, Salmon, Pickerel, Northern Pike, Rainbow and brown trout
Mammals: Deer, rabbits, raccoons, muskrat, foxes, porcupines, woodchucks, beaver and coyote[84]
Deciduous-dominated forests, with some conifer species: Eastern red cedar (Juniperus virginiana); White Pine (Pinus strobus); Tulip tree (Liriodendron tulipifera)

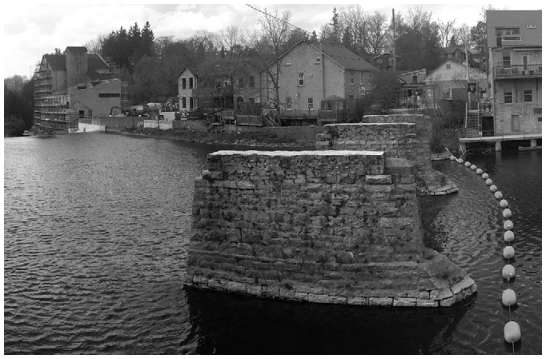


FIG. 71 ELORA MILL INN & VICTORIA ST BRIDGE PIERS IN ELORA

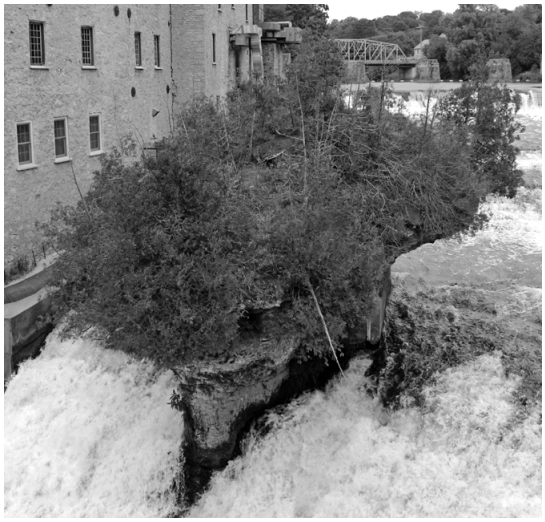


FIG. 72 TOOTH OF TIME

FIG. 73 ELORA GORGE

Unearthing the Grand
Points of Interest

FERGUS – The town of Fergus is credited to who Scottish immigrants, namesake Adam Fergusson and James Webster, who purchased its lands in 1833 and took invested interest in the urban planning and development of the town. [85] Fergus claimed its long-term identity within the Grand River Valley with several successful milling industries and connection to the greater rail systems that helped to make its location profitable.

WILSON MILL (ST. ANDREW MILLS) & DAM – Located in Fergus, and originally the Oatmeal Mill, but also called St. Andrew's Mill, Fergus Mill, Walkey Mills, Monkland Mills, and eventually renamed for its owner, James Wilson, this 1855 grist mill housed an operational water wheel up until 1984, and was kept in production until 1993. The water wheel used kinetic energy created by the flow of the river to mill flour. The building has seen many uses over time, including the modern luxury apartments converted in 2003.[86] The Wilson Dam is a concrete wear, originally constructed to power the Wilson Mill, and is now used to collect hydroelectricity for the Grand River Conservation Authority.[87] You will need to portage over the dams in Fergus.

GENERAL STEEL WARES (BEATTY) DAM – Located in Fergus, this dam is one of several across the Watershed that have fallen to the forces of time and the power of the Grand River's flow. It failed in 2004 leaving behind only its concrete base, where once timber restrained waters for power generation at the nearby Grindley Farm Implement Factory during the 1870's, and then the household brand Beatty Brothers Limited in 1874, and finally the General Steel Wares company in 1964.[88] You will need to portage over the dams in Fergus.

ELORA – Scottish born Willian Gilkison bought a significant portion of land, and at the waterfalls of the Grand River, founded the village of Elora in 1832. The town was named for Gilkison's brother's ship, inspired by the Temples of Elora in India.[89] Elora is famed for many successful industry enterprises, including furniture factories and regional markets.

ELORA QUARRY – The Elora Quarry was once an active limestone quarry, from which much of the nearby towns of Fergus and Elora built their historic buildings from. Today, the Elora Quarry Conservation Area provides swimming, hiking and picnicking recreation to thousands over the course of the summer.[90]

ELORA (DRIMMIE) MILL – In 1944 known as the Drimmie Mill for its most recent owner Norman Drimmie, then the Elora Mill, and now the Elora Mill Inn, the building was first constructed in 1833, and much of what stands today dates back to 1842. Fires damaged the mill in 1859, 1865 and 1870, each time inspiring greater vigor in new construction, resulting in the five-storey limestone façade of today, rivalling only Montreal for the tallest rubble wall. It was used until the mid-twentieth century for flour milling, and afterward for custom feed and lumber milling until 1976.[91] You will need to portage over the dams in Elora.

THE TOOTH OF TIME & ELORA GORGE – The Tooth of Time stands as a naturally formed threshold marking the boundary between downtown Elora and the Elora Gorge, as it sits central to the falls on the Grand River just below the Elora Mill Inn. Past this natural heritage relic, the 25-meter-high walls of the Elora Gorge rise quickly and continue through 3 kilometres of "unparalleled opportunity to observe the layers of bedrock in the Watershed Area". [92] Previous to the nineteenth century, the Elora Gorge was clear-cut for construction and industry, and was

one of the first locations in the Grand River Valley to have citizens enacting conservation efforts independently. This area is now a recognized Area of Natural and Scientific Interest for Life Sciences (ANSI-LS), and is conserved as such. The geologic formation of these landscapes occurred through the travel of rapidly moving meltwaters from the Wisconsin Glacier during pre-historic times.[93] You will need to portage over the Tooth of Time in Elora.

ELORA GORGE BRIDGE & CA – Visible from downtown Elora, the Elora Gorge Bridge, or *High-Level Bridge*, that connects County Road 7 over the gorge was built with some controversy over its interference with the highly valued natural setting, but has provided cantilevered passage over the gorge since 1980.[94] The Elora Gorge Conservation Area begins after the bridge, and continues on through to the *Low-Level Bridge*, just before the township of Inverhaugh. The Elora Gorge Conservation area consists of rocky, forested lands that drop steeply down to meet the Grand River. It provides a large number of rentable campsites for overnight camping, hiking trails and tubing activities over the white-water rapids of the river through the gorge. It is recommended that you portage through parts of the Conservation Area, as whitewater rapids often provide great difficulty to non-expert paddlers.[95]

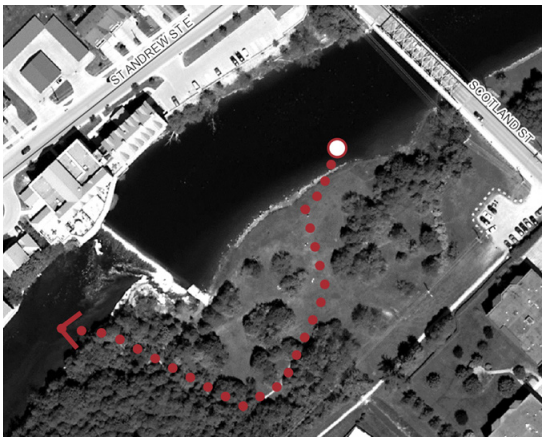


FIG. 75 ST ANDREWS DAM PORTAGE

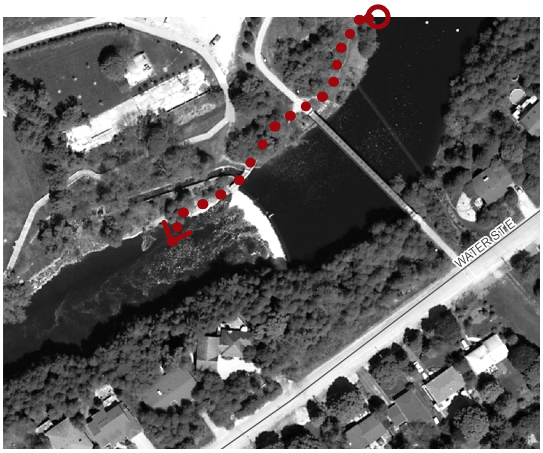


FIG. 76 BISSEL DAM PORTAGE

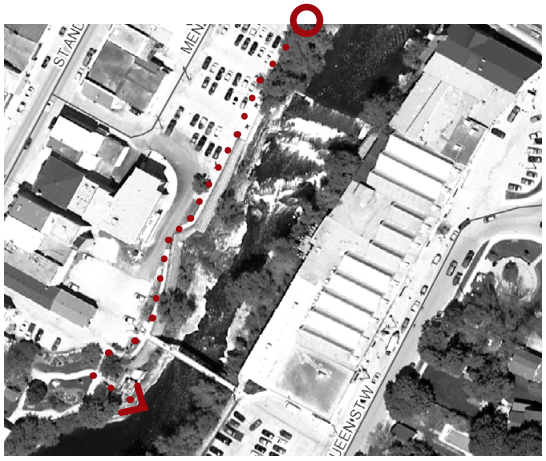


FIG. 74 BEATTY DAM & CASCADE PORTAGE

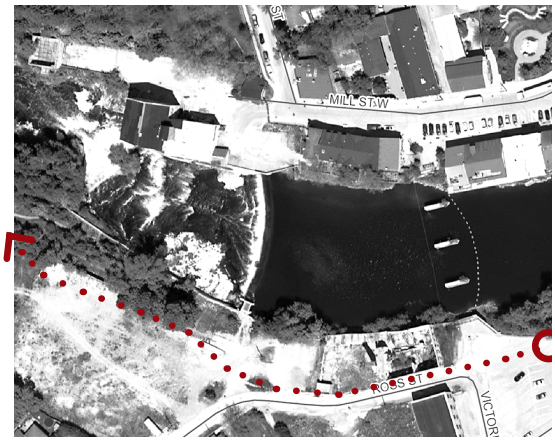


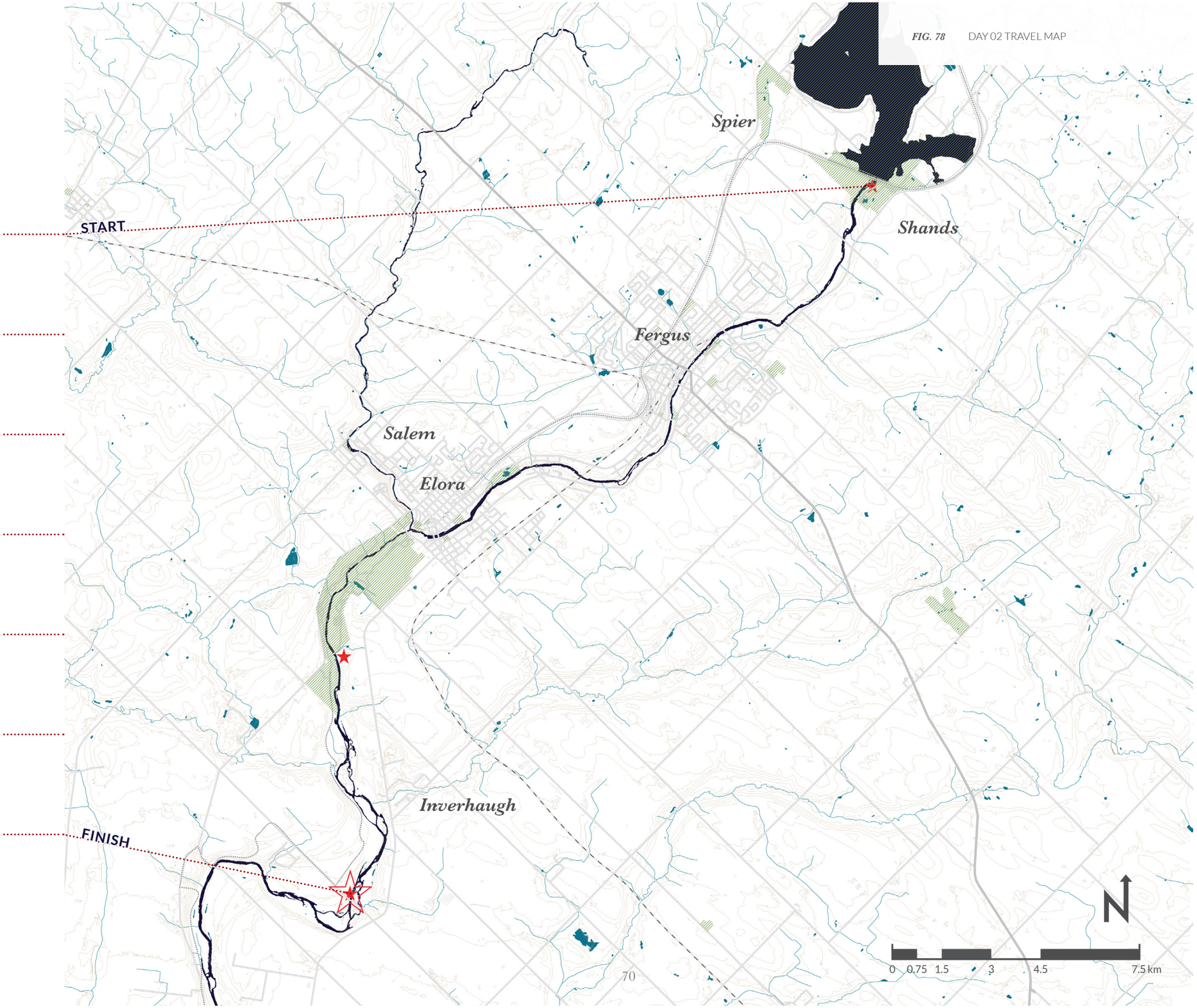
FIG. 77 DRIMMIE DAM & TOOTH OF TIME PORTAGE

Unearthing the Grand
Timeline & Maps

Trip Hours	*Map Number*	*Activities*	*Place & Point-of-Interest*
	01		SHANDS
0	02		BELWOOD LAKE CA & SHAND DAM
	03		WELLINGTON COUNTY RD 26 BRG
	04		GARTSHORE ST BRG
	05		
	06		FERGUS
+1	07		FERGUS & DISTRICT CC TRAIL
	08		WILSON'S MILL - WILSON MILL DAM
	09		OATMEAL, MONKLAND, GROVES & WALKEY'S MILLS
	10		TEMPLIN GARDENS
	11		HWY 6 BRG
+2	12		CALDWELL BRG & TOWER ST BRG
	13		ELORA
	14		ELORA QUARRY
	15		BISSEL & DRIMMIE DAMS
	16		METCALFE ST & VICTORIA ST BRGS
+3	17		THE KIDDY KAR FACTORY
	18		ELORA MILL INN AKA DRIMMIE MILL
	19		TOOTH OF TIME
	20		R IRVINE CREEK-LOVER'S LEAP & DAVID ST BRG
	21		ELORA CATARACT TRAILWAY
+4	22		WELLINGTON COUNTY RD 7 BRG
	23		ELORA GORGE BRG, ELORA GORGE CA & TRAIL
	24		HIGH LEVEL BRG
	25		LOW LEVEL BRG & TROUT FISHING AREA
	26		INVERHAUGH
+5	27		R SALEM CREEK
	28		R CARROLL CREEK
	29		L SWAN CREEK
	30		8TH LINE BRG
	31		BRAIDED ISLANDS & RIVERBOUND FARMS
+6			

PARK CAMP DAM BRIDGE RUIN HIKE PUT-IN PORTAGE SWIM FISH WATCH

FIG. 78 DAY 02 TRAVEL MAP



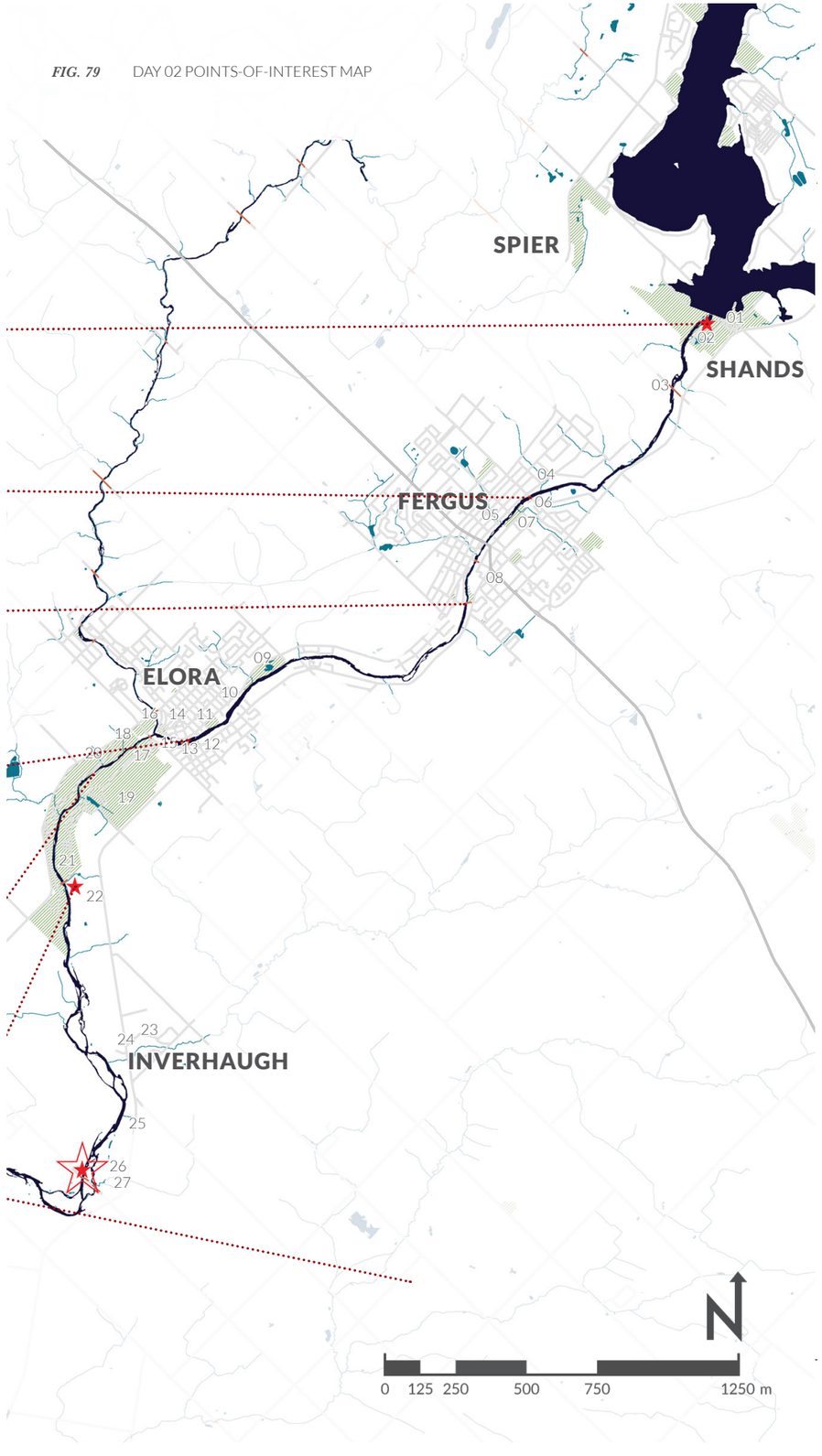


FIG. 79 DAY 02 POINTS-OF-INTEREST MAP

Braided Islands of Inverhaugh

The natural heritage of the Grand River is ever-present in the sheer range of environments that it supports. The site at Inverhaugh is particular, as it presents a tension between the developed agricultural lands that continue to press in on those lengths of the river that retain their wilderness. In this region of the Grand River, plant species from both the Carolinian and Hardwood Deciduous Forests mingle, and provide the prospective habitats for many of the Grand River's animal species. Currently, a parking lot is provided off the north side of the 8th Line Bridge for recreational fishing. One osprey or bald eagle elevated nesting platform has been built on the site to encourage predatory occupation in the area. No trails are maintained for recreational hiking, and a general lack of visitors has allowed the site to grow over with native species from both the Alleghenian and Carolinian forests of the watershed.

Invernaugh marks a unique formation of the landscape in the Grand River, where the river winds itself through multiple shallow channels, creating islands that are called braid bars. This is the results of a dramatic decrease in the river's depth after the Elora Gorge, as the Grand River winds its way down through the northern till plains with great amounts of sediment.[96] Landscapes like these are important to the Grand River's history because the shallow, broken riverine landscape allowed for eased passage for early settlers throughout the watershed. Though it is not recorded in the Grand River's history, the islands of Inverhaugh may easily have been a major ford crossing for the indigenous peoples of the area.

FIG. 80 DAY 02 ISLANDS OF INVERHAUGH
SITE MAP

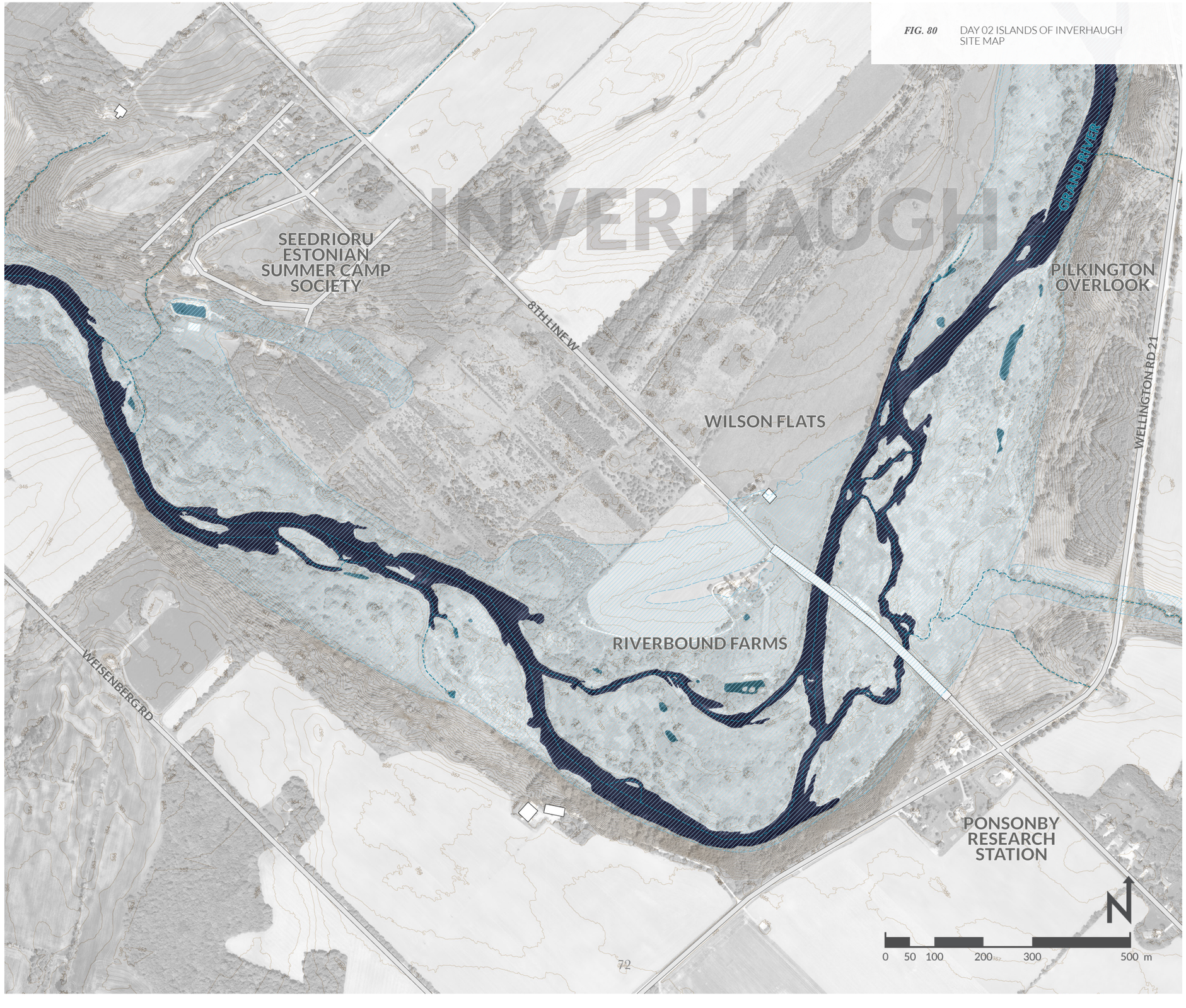


FIG. 81 INVERHAUGH TROUT FISHING TRAIL & 8TH LINE BRIDGE

Unearthing Inverhaugh

The braided islands are easily overlooked when travelling in the water, since, when one path is chosen the other disappears. The activation of this site, relies on a sense of connectivity through the five bridges that cross the river, connecting gravel trails concentrated at the perimeters of the islands. These bridges also mark the multiple river access locations at this site, offering repeated opportunities to get out and explore.

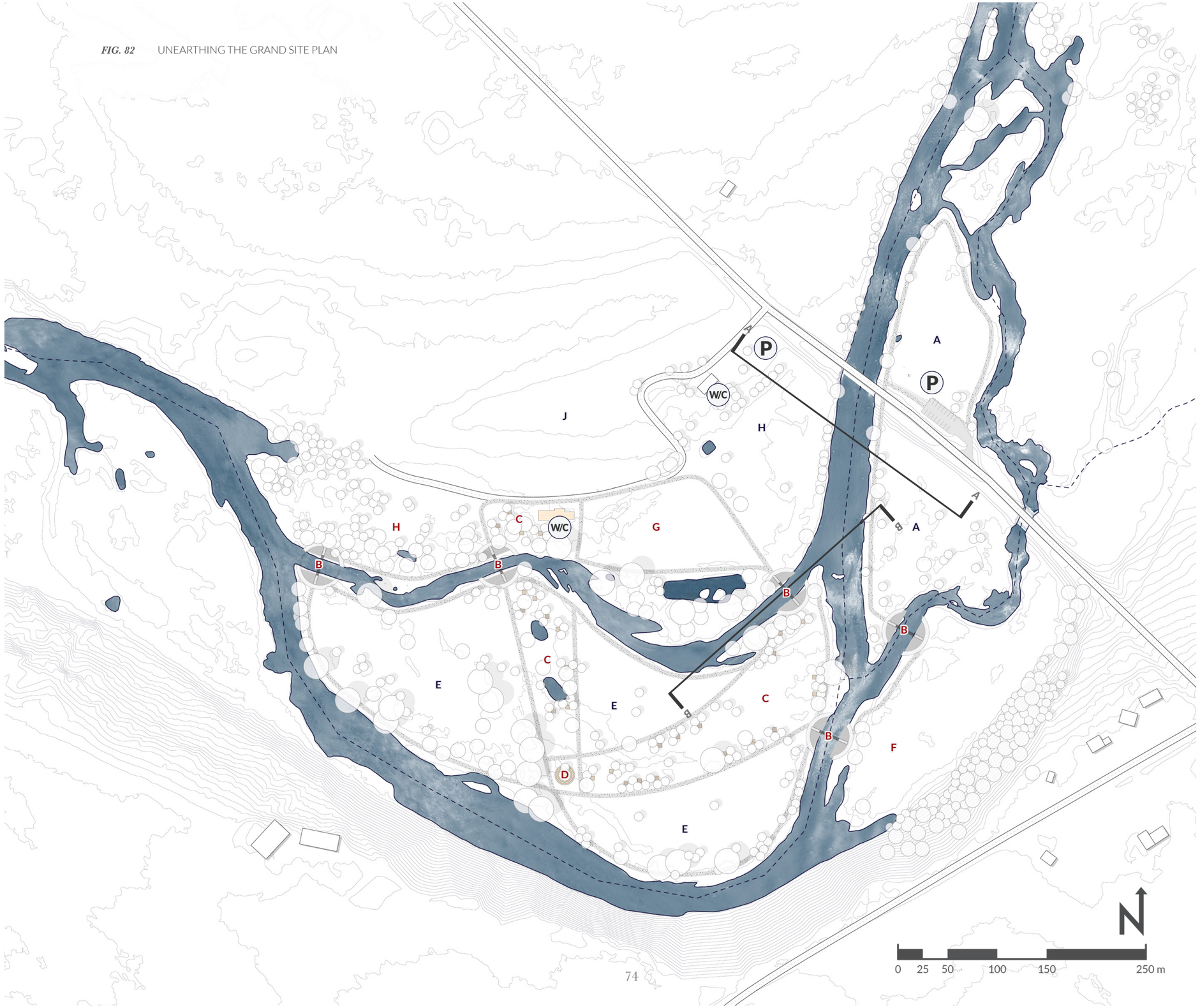
On the islands, the land already claims distinct vegetative characteristics, presenting the meadow, grassland and savannahs known throughout the Watershed. The southern meadow island provides shade and soft grassy fields to camp on, making it optimal for the campgrounds of the site. An axial corridor is introduced, crossing over the river and onto the northern bank shared with Riverbound Farms. Here, the agricultural history is celebrated and presented with a natural orchard to the east and a crop garden to the west, for visitors to explore. On the southern bank of the site, a berry garden will be maintained for exploration. The orchard and garden crops are reserved for harvesting as educational events, to be orchestrated by the farm owners at scheduled times.

The design implemented on this site asks the visitor to enter the landscape, and to walk among a selection of the Grand River's vast offerings in flora and fauna. The paths that meander through the gardens jump from one landmass to the next over simple, pedestrian foot bridges, dotted among the landscape with the intention to draw visitors in, signalling that there is more to see and experience.

A GRASSLAND SAVANNAH
B PEDESTRIAN BRIDGE & PUT-IN SITE
C CAMPGROUND
D COMMUNAL FIRE PIT
E MEADOW
F BERRY CROP
G VEGETABLE CROP GARDEN
H ORCHARD GARDEN
J RIVERBOUND FARMS CROPS
K RIVERBOUND FARMS BARN & STABLES

EXISTING PROPOSED

FIG. 82 UNEARTHING THE GRAND SITE PLAN



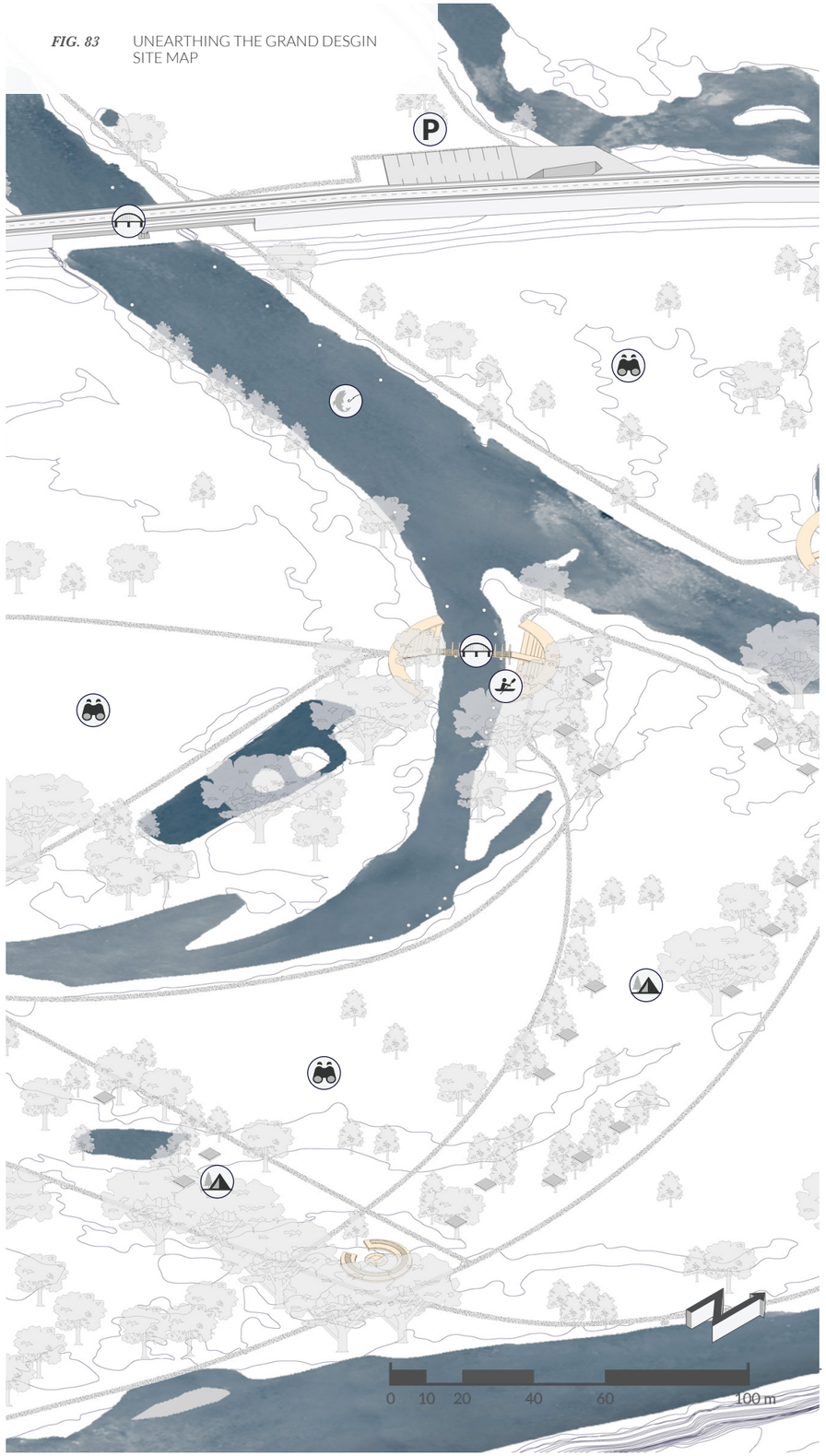


FIG. 83 UNEARTHING THE GRAND DESGIN
SITE MAP

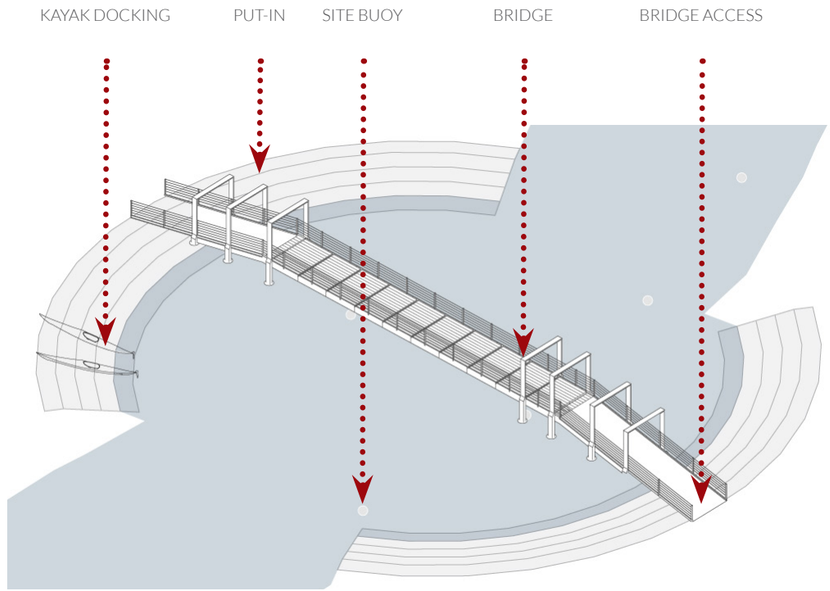


FIG. 84 UNEARTHING THE GRAND SITE PUT-IN
& BRIDGE

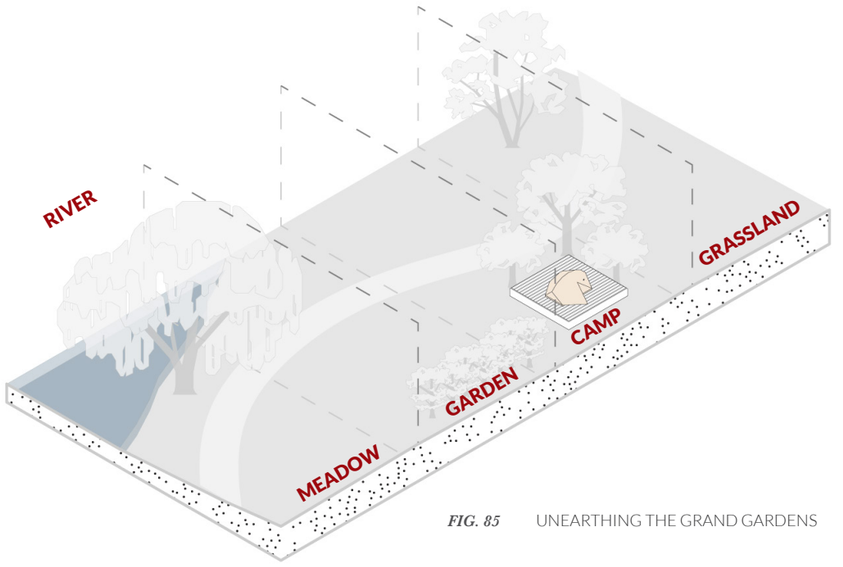


FIG. 85 UNEARTHING THE GRAND GARDENS

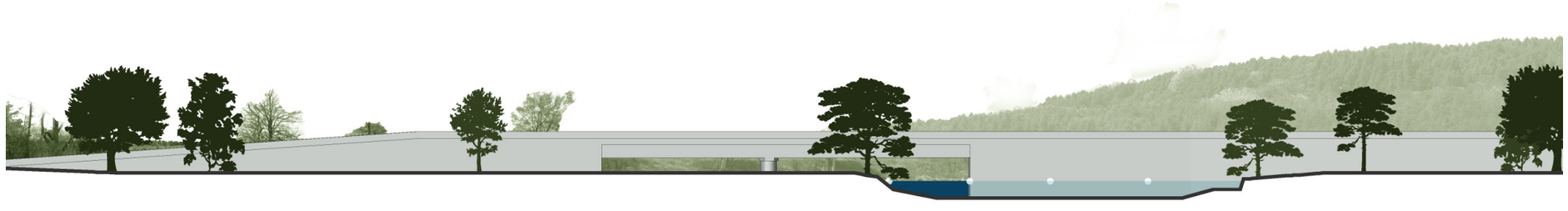


FIG. 86 UNEARTHING THE GRAND SECTION AA
- BRIDGE ELEVATION

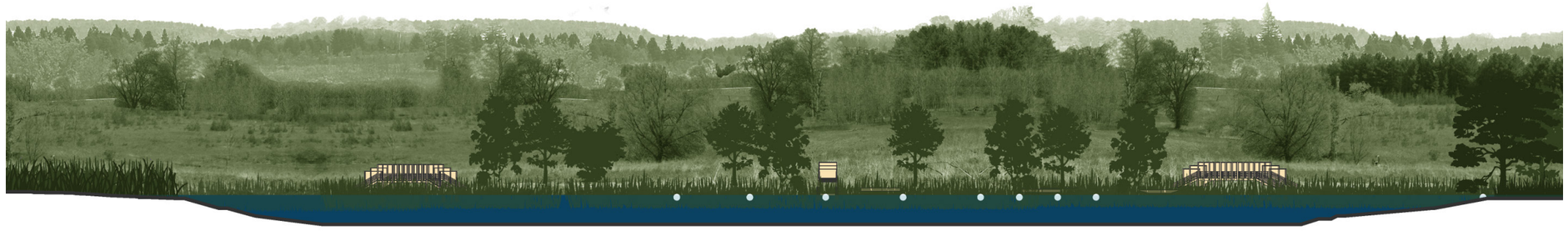


FIG. 87 UNEARTHING THE GRAND SECTION BB
THROUGH RIVER

0 5 10 20 30 50 m

FIG. 88 UNEARTHING THE GRAND VIEW FROM HWY BRIDGE

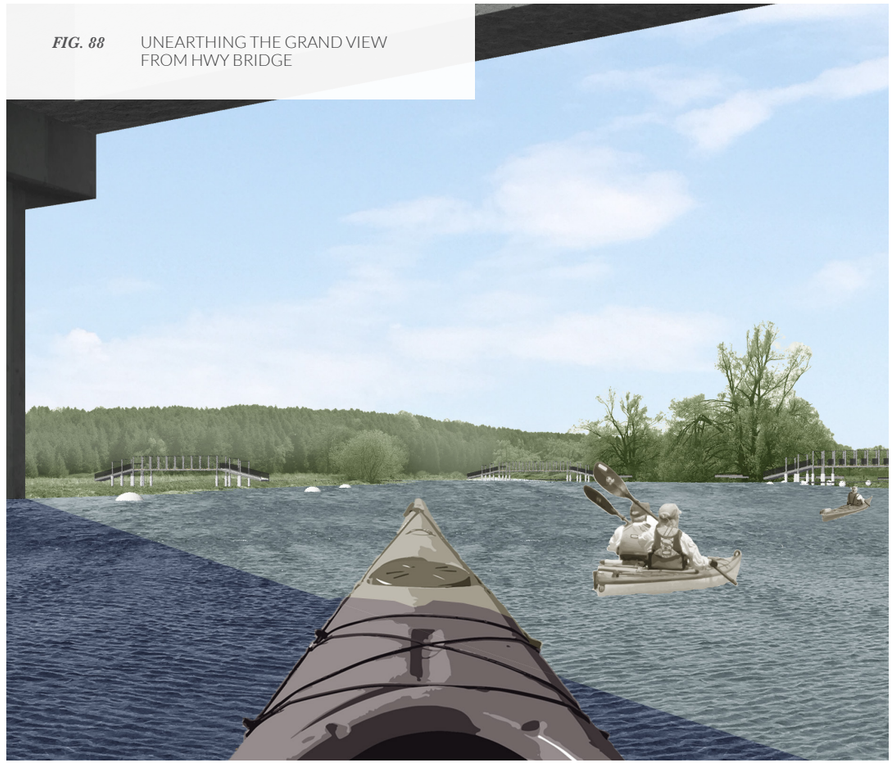
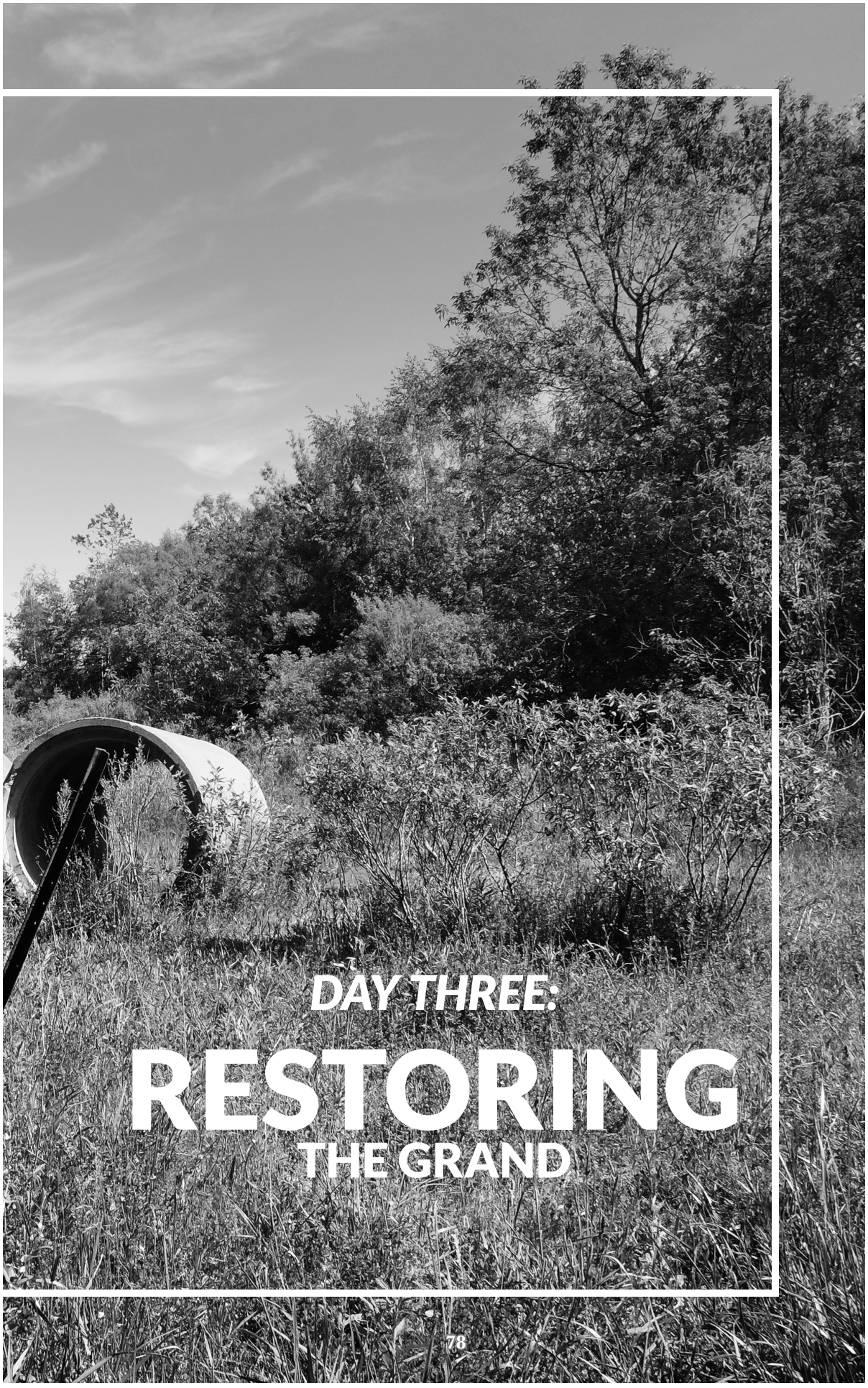


FIG. 89 UNEARTHING THE GRAND VIEW FROM PUT-IN SITE

FIG. 90 INDUSTRIAL REMAINS AT SNYDER'S FLATS CA.



DAY THREE:

RESTORING
THE GRAND

Restoring the Grand
Overview

revert |rə'vərt|
verb

1 [no object] (revert to) return to (a previous state, practice, topic, etc.): he reverted to his native language | he ignored her words by Restoring to the former subject.
- Biology return to (a former or ancestral type).
- Law (of property) return or pass to (the original owner) by reversion.

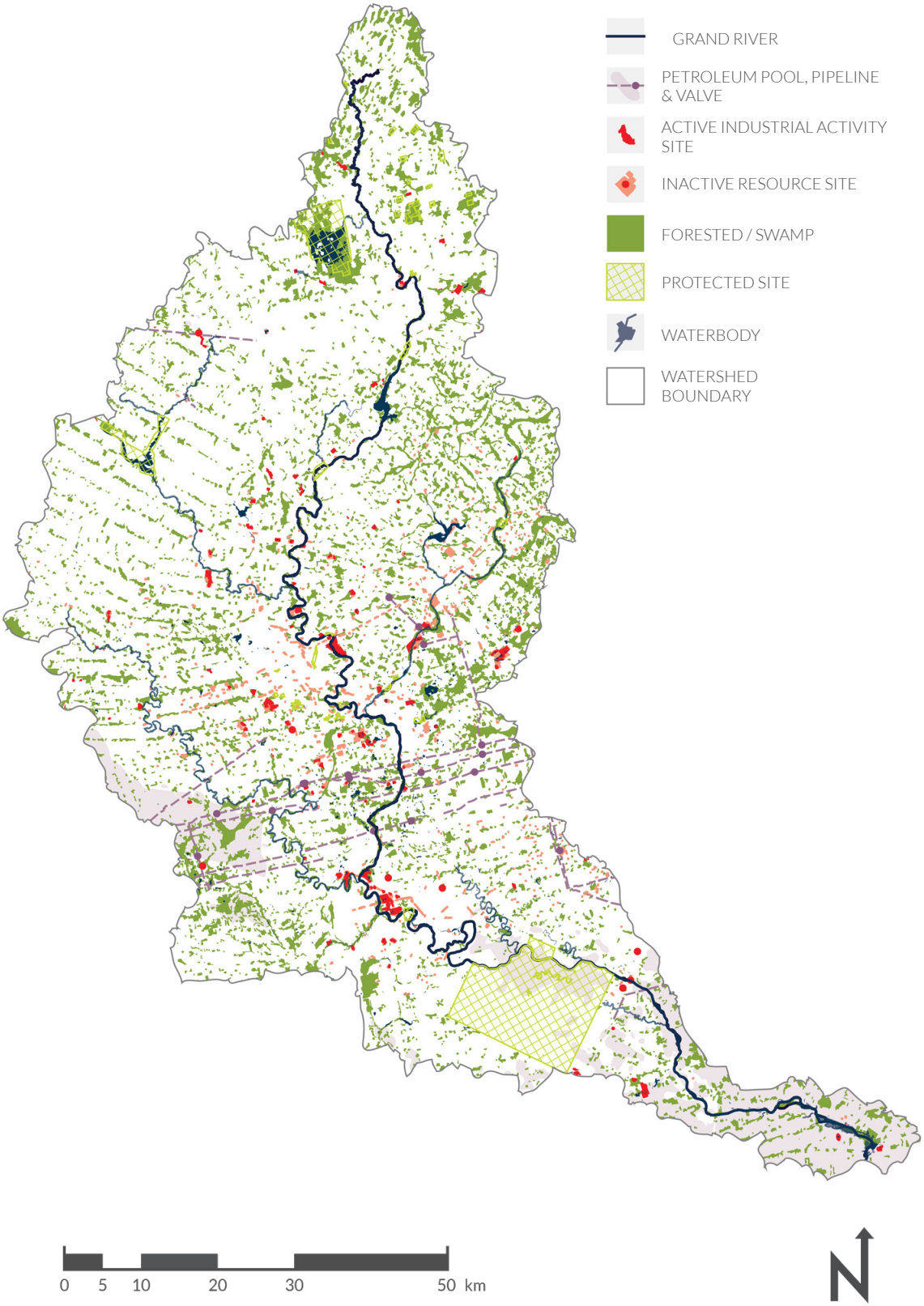
2 [with object] archaic turn (one's eyes or steps) back.

This third chapter of Guiding the Grand, *titled Restoring the Grand, passes through the scenic rural landscapes that characterize the vast majority of land cover in the Grand River Valley. Mennonite culture has long been a major influence in land development of the Grand River Valley, particularly in the area explored in this section, however, settlement in the area once held more industrial character from broader influences. Little urban sprawl or major industry is found today in the greater villages of West Montrose and Winterbourne, but echoes of a more industrial past linger in the road signs, and in the several-tonne capacity of steel bridges still spanning the Grand River in these historic townships – and here an opportunity arises to restore a sense of what has been, and to revel in the bountiful natural heritage that has grown back in its place. The Grand River Conservation Authority (GRCA) has taken part in many restorative efforts, attempting to bring greater health and awareness within the Watershed since the major deforestation and largescale industrial implementation during early settlement.*

This 22km stint of the Grand River contains no permanent obstacles that warrant portage, but there are a few special sites that are worth pulling out to explore. The first of these sites from Inverhaugh is the village of West Montrose with its historic Covered Bridge, known to locals as the 'Kissing Bridge'. You arrive at the end of this stint of travel at the site of *Reverting Snyder's Flats*, within Snyder's Flats Conservation Area.

EVOLVING INDUSTRY – The main industries across the Grand River Watershed today differ somewhat from those small settlements and thriving villages that harnessed the early potential of the river in their founding. As discussed in the previous chapter, *Unearthing the Grand*, agriculture remains to be the largest and most steadfast economic power in the region. Industrial works, such as gravel pits, refineries and mines have steadily declined in recent decades in favour of more retail-oriented industry, as well as a booming technological hub in the Kitchener-Waterloo area. Examples of repurposed industrial sites like Elora Quarry, and restored natural areas like the Elora Gorge, present a distinct landscape, and one where a visitor might be able to interpret an evolution of its form through time. In most areas, it is difficult to imagine the different uses the land has played a role in, and what histories are no longer present in physical form. In most cases, these uses and histories have resulted in the towns and cities of the Grand Watershed, which benefit from ongoing municipal care-taking. In other cases, active mines and gravel pits provide economy, with carefully implemented sustainability practices to maintain healthy ecosystems during and after their time.

FIG. 91 GRAND RIVER WATERSHED INNDUSTRY & RESTORATION



CONSERVATION & ENVIRONMENTAL RESTORATION – It is said that the landscape of the Grand River was disturbed somewhat by the Indigenous forerunners to European settlement, however, the major changes to the river's operational integrity are credited to massive undertaking in deforestation, wetland draining and swamp burning from the late 1800s through to the 1930s.[97] Since that time, major undertakings by the Grand River Conservation Authority, aided by provincial and municipal efforts, have brought the river and its watershed back toward a state of health and prosperity through water treatment plants and other measures.
There is a great need for further involvement from government and private groups alike to protect, enhance and restore the indigenous forests, grasslands and wetlands of the watershed. Nelson argues for a more connective approach, creating a greenbelt through larger protected sites that allow for migration of plants and animals, and a richer biodiversity.[98] The Grand River system is difficult to account for at a National level, and even Ontario's provincial government struggles to contribute to the day-to-day work conducted in Water Management on the Grand River. Even still, many private and public programs, policies, and regulations have been enacted to enforce greater and more involved stewardship across all stakeholders within the Grand River Valley.[99] The GRCA has been the greatest force acting in efforts to restore the lost natural heritage of the Grand River and Watershed, and has been encouraging partnership in private and public efforts alike. These works began with protecting the existing forests, wetlands and natural corridors from further loss, and have progressed toward active restoration across the Watershed.

As previously mentioned, the waterways of the Watershed have undergone great changes in the advancement of industry, some of which have been revoked in efforts to return the flows to their natural state, and provide a broader habitat for native fish. Some small dams built at the height of the Grand River's industrial era with no contemporary use have been removed, including Fergus and Cambridge. [100]

Grasslands that once provided habitat for certain lost plant and animal species were ploughed over in the 1800's for farmland in the central watershed, and now only a few remain for conservation by the GRCA in its eleven active parks. These include the Apps' Mill Conservation Area (Brant), Brant Park (Brantford), Pinehurst Lake Park (Brant), F.W R. Dickson Wilderness Area (near Cambridge), Snyder's Flats (Kitchener), and Luther Marsh Wildlife Management Area, and more. Controlled burning and maintained mowing are techniques used to ensure safe natural life cycles for these habitats.

Around sixty percent of the wetlands of the Grand River Watershed have been drained or lost since the 1800's. The bogs, swamps and marshes are irreplaceable habitats for all biodiversity within the Watershed, contributing to better water quality, fewer floods, and sable shorelines. Remaining wetlands are being protected and expanded by the GRCA, and lost ones encouraged to return through efforts like The Monticello project at Luther Marsh, or former farmlands being converted to a wetland habitat as part of the Dunnville Marsh.

While the Grand River Valley remains lush and green, its forests were once so thick it was unthinkable to enter into them. By 1900, only five percent of the land remained forested, from the near hundred percent previous to human development. In recent years, that percentage has been brought up to 19 percent, from natural regeneration and the GRCA's efforts in replanting millions of trees over decades.[101]

NATURAL DESIGNATIONS (ANSI's & ESA's) – There are Areas of Natural and Scientific Interest (ANSI's) as regulated by the province, and Environmentally Sensitive Areas (ESA's) regulated by the municipal governments, as well as Conservation Areas (CA's) owned and operated by the GRCA. These designations do not act together, as ANSI's do not apply legally to any lands that are not also designated ESA's within their municipalities.[102] Areas without these regulations become more vulnerable with increasing urban growth in the watershed.

Parts of the Grand River's Carolinian Forests are protected in the southern reaches by a partnership between the University of Guelph with the GRCA, funded in part by the government of Ontario's *Exceptional Waters Program*. Additionally, Waterloo Region works with the GRCA in assisting farmers in education and management on manure containment and water quality awareness practices in the *Rural Water Quality Program*.[103] These efforts are keystones in public involvement with river conservation awareness, and speak to a growing sense of stewardship among specific social groups within the watershed.

RURAL WATER QUALITY PROGRAM (RWQP) – Loss of vegetation at waters' banks has resulted in the loss of shade, and the increase in erosion, resulting in warmer, faster flows that limit habitation. In order to encourage greater growth at the edges of rivers and streams, many kilometres have been fenced off in order to keep cattle from grazing too near to them. Trees and shrubs have been planted in these locations to soak up runoff nutrients, like nitrates and phosphorus, from farms that would otherwise enter the waters directly and cause problems for native species. These projects for farms were often financed by the Rural Water Quality Program or else with help from the Grand River Fisheries Management Plan.

GRAND RIVER CONSERVATION AREA PROTECTION COALITION (GRCAPC) – The Grand River Conservation Area Protection Coalition was devised in efforts to preserve the richness of natural heritage in a larger area of Ecosystem E7. This region ranges down from Toronto, carrying over to the Grand Bend, and down toward Lake Erie, inclusive of the lower half of the Grand River Watershed.[104]

FIG. 92 GRAVE PIT & QUARRY IN THE GRAND RIVER WATERSHED

FIG. 93 GRAVET MOUND NEAR ELORA

Restoring the Grand
Points-of-Interest

WEST MONTROSE COVERED BRIDGE – A treasured piece of Watershed history, the West Montrose Covered Bridge, sometimes called the 'Kissing Bridge', was built by a local barn builder in 1881. It now stands as the last original covered bridge in Ontario from the 1800's, and the second oldest bridge in Waterloo Region. Up until 1998, the bridge was owned by the provincial government, at which point it was passed over to the Waterloo municipal government.[105] It is a destination point for most paddlers on the river, who have the opportunity to pull out onto a maintained lawn below the bridge.

WINTERBOURNE BRIDGE (PEEL ST BRIDGE) – A multi-span pin-connected truss bridge, called a Camelback truss, this steel bridge has been little altered since its construction in 1913. It is considered to have great heritage value as a rare and beautiful design acting as a community gateway and landmark.[106]

CROOK'S TRACT BRIDGE (BUGGY BRIDGE) – Composed haphazardly with salvaged steel, this riveted steel constructed bridge spans the Grand River with girder spans at the southern end, and truss spans at the northern end. It is suspected to have been constructed and maintained by local Mennonite population, since it is not owned by any government, and possesses no engineering assurance of its stability.[107]

BLOOMINGDALE – The lands that are now called Bloomingdale were once called Snyder's Corners after Jacob Snyder, the man who bought and settled the area from 1807, before which it was known as the Oxbow Lot to the Six Nations peoples of the Grand River Valley. The area has a rich indigenous history, with the area originally occupied by the Huron peoples of Georgian Bay, and then the Mohawk peoples of the Six Nations, next English and Irish settlers who were edged out by the proficient farming of the Pennsylvania Dutch. [108]

KAUFMAN FLATS – This area has a long history as a destination for recreational outings. In the late 1800s, large groups from Berlin (Kitchener) and Waterloo would cross the Grand River at the ford to picnic at Snyder's Flats. Many cottages were constructed along the Grand River at this time. In the 1920s, A.R. Kaufman, of Kaufman Rubber fame, purchased land on the west side of the river. On the property, he built a home overlooking the river floodplain, which became known as Kaufman Flats."[109]

FIG. 94 WEST MONTROSE COVERED BRIDGE

FIG. 95 WEST MONTROSE COVERED BRIDGE

FIG. 96 WINTERBOURNE STEEL BRIDGE

FIG. 97 WINTERBOURNE STEEL BRIDGE

FIG. 98 CROOK'S TRACT STEEL BRIDGE

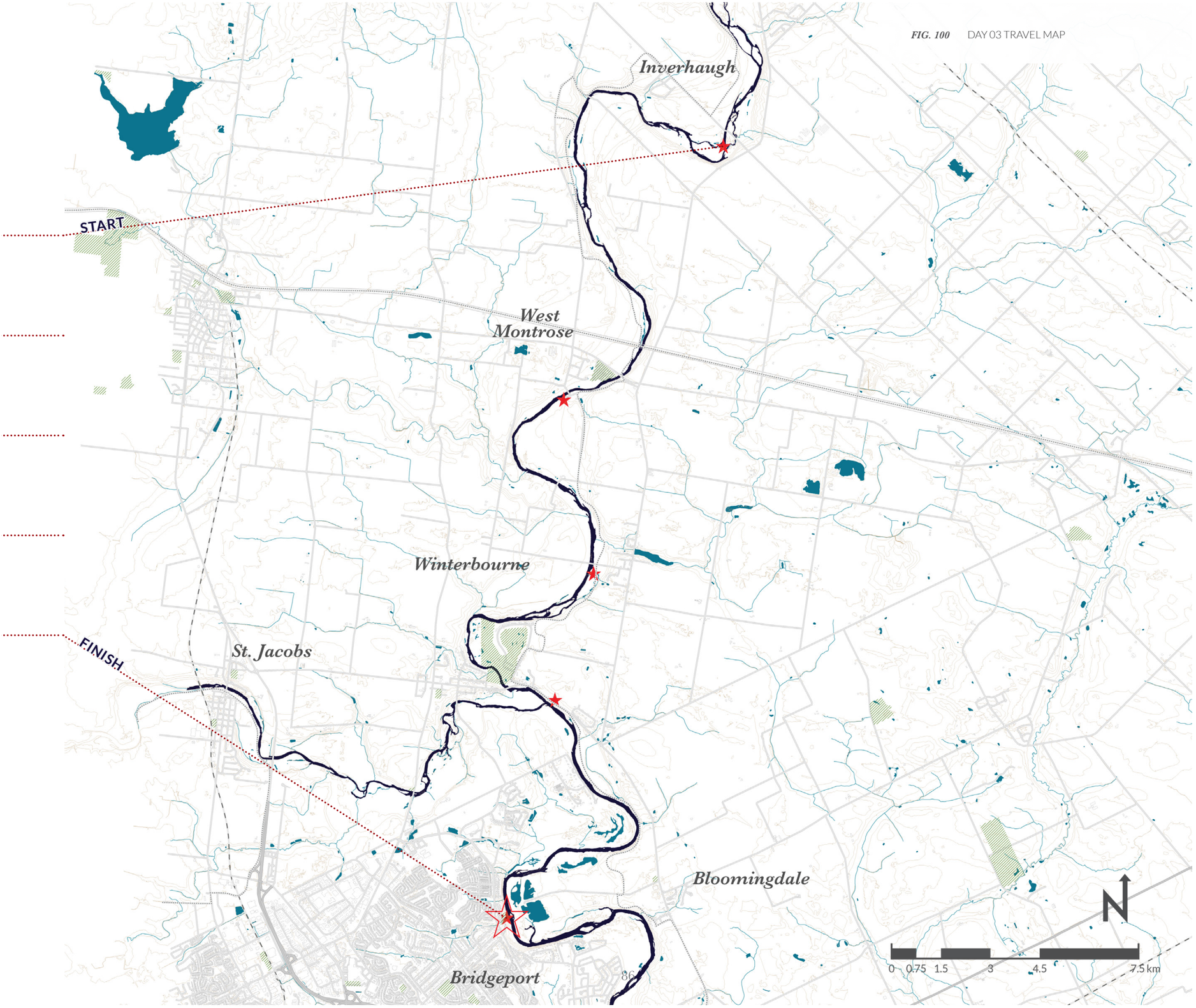
FIG. 99 CROOK'S TRACT STEEL BRIDGE

Restoring the Grand
Timeline and Maps

Trip Hours	Map Number	Activities	Place & Point-of-Interest
	01		**INVERHAUGH**
0	02		8TH LINE BRG
	03		BRAIDED ISLANDS & RIVERBOUND FARMS
	04		CHAMBERS BRG
	05		
	06		**WEST MONTROSE**
+1	07		OLDE BRG PLACE BED AND BREAKFAST
	08		WEST MONTROSE COVERED 'KISSING' BRG
	09		CROOKS TRACT STEEL BRG
	10		R CANAGAGIGUE CREEK& L COX CREEK
	11		**WINTERBOURNE**
+2	12		WINTERBOURNE BRG AKA WELLINGTON COUNTY RD
	13		17 BRG
	14		L CONESTOGA CREEK
	15		**CONESTOGO**
	16		R CONESTOGA RIVER
+3	17		CONESTOGO GOLF CLUB HYDRAULIC BRGS
	18		KAUFMAN'S FLATS
	19		**WATERLOO**
	20		R COLONIAL CREEK
	21		**BLOOMINGDALE**
+4			SNYDER'S FLATS CA

PARK CAMP DAM BRIDGE RUIN HIKE PUT-IN PORTAGE SWIM FISH WATCH

FIG. 100 DAY 03 TRAVEL MAP



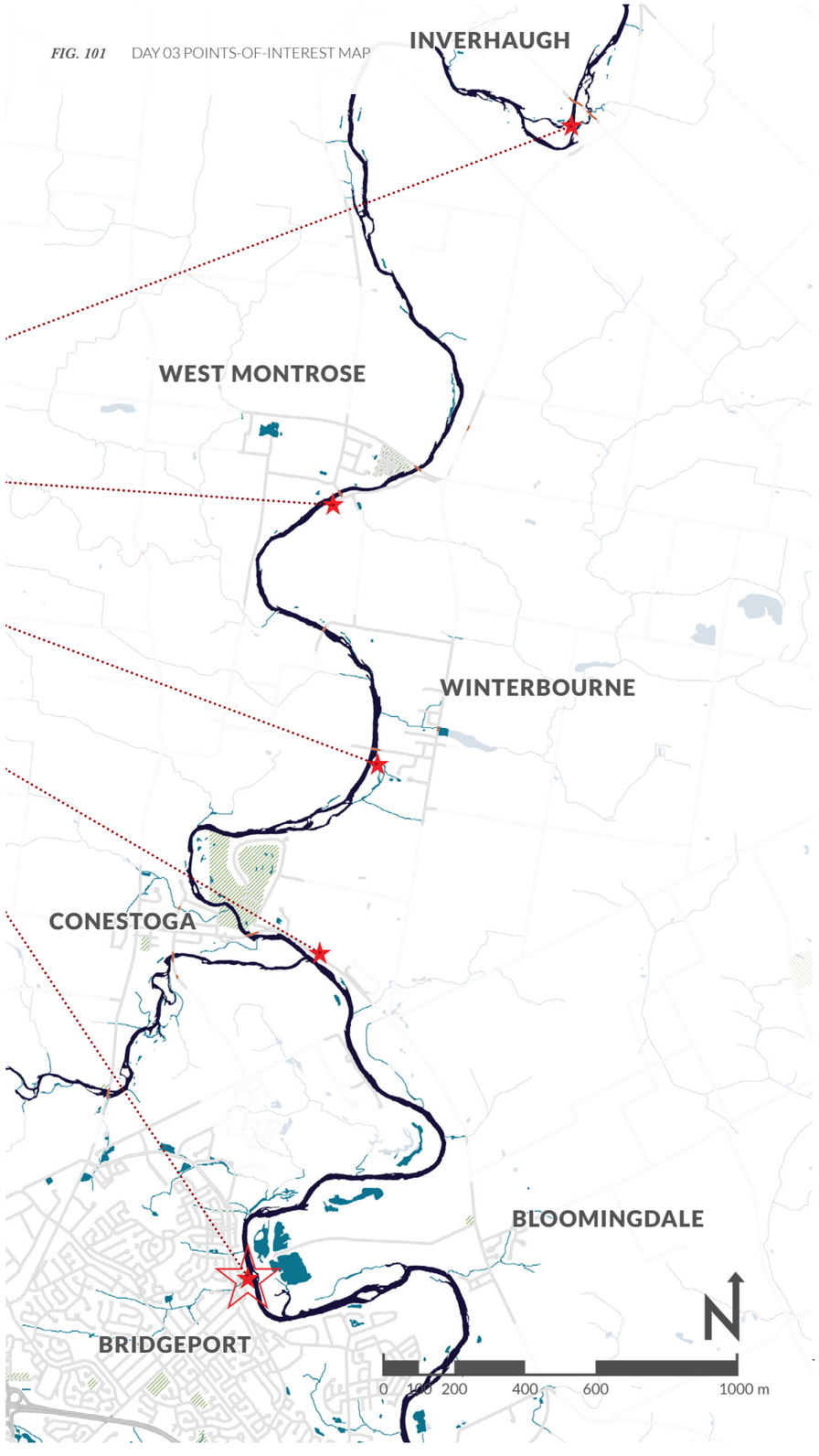


FIG. 101 DAY 03 POINTS-OF-INTEREST MAP

Snyder's Flats Conservation Area

Jacob Snyder's son, Christian Snyder, claimed lands within the lot for himself, that included a shallow enough section of the Grand River to cross on foot, referred to as Christian Snyder's Ford. By the mid-1800's, a bridge was petitioned for at the ford's location, but were denied, and so citizens built a small and temporary pedestrian bridge that has not lasted to present day.[110]

The restored lands of Snyder's Flats were designed to be reverted back to natural conservation lands upon the inception of its gravel site work. The lands were conscientiously mined for gravel over the course of twenty years, with an implemented restoration master plan, carried out with great respect to both the hydrological and biological environments. Since its opening to public in the 1990's, the lands have been restored healthily along with the river, now supporting new species of animals and plant for visitors to enjoy. This site poses an excellent opportunity to understand how industrial land appropriation can result in an amazingly healthy riverine environment – the only thing lacking, is an awareness of the site's past! Simple canal structures allow for controlled flooding of the north and south floodplains. Long bridges create short-cut access across the site and provide sightlines to encourage exploration. These gentle-sloped mounds are created using gravel procured from the site. The paths that circle the mounds have concrete foundations that help to keep the mounds from eroding quickly. Portions of the mounds will be constructed using large aggregate to discourage human interference, sand and grasses to create texture, and sad for small beaches on the coldwater pond.

The restored lands of Snyder's Flats were originally designated to be reverted back to natural conservation lands upon the inception of its gravel site work. The lands were conscientiously mined for gravel over the course of twenty years, with an implemented restoration master plan, carried out with great respect to both the hydrological and biological environments. Since its opening to public more than 20 years ago, the lands have developed healthily along with the river, now supporting new species of animals and plant species for visitors to enjoy. This site poses an excellent chance to understand how industrial land appropriation can result in an amazingly healthy riverine environment – the only thing lacking, is an awareness of the site's past!

FIG. 102 DAY 03 EXISTING SITE MAP

Restoring Snyder's Flats

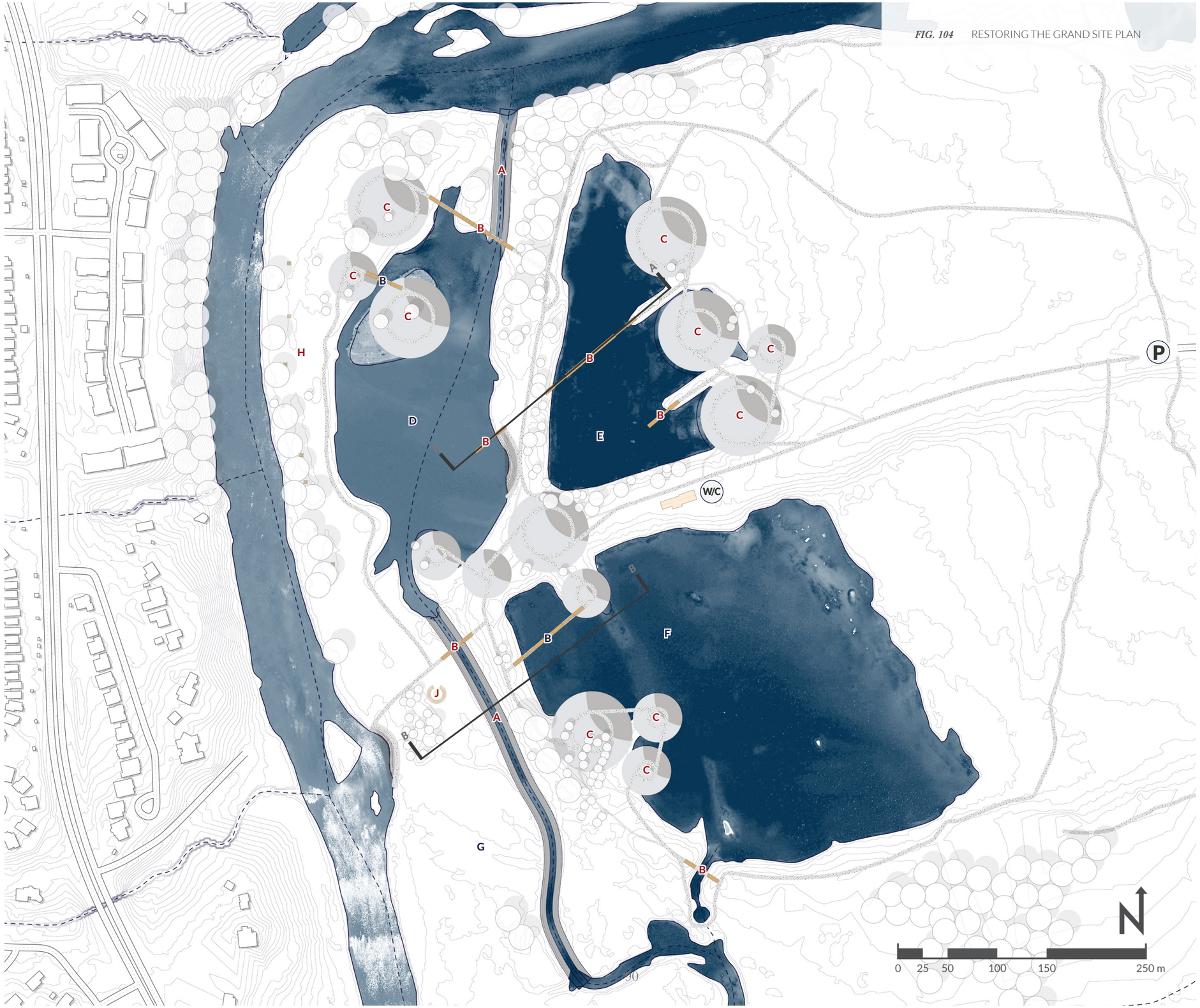
In recognition of this site's past, a series of mounds echoing those one would find at an active gravel pit or gravel mining area, signal the distance and scope of accessible parts of the landscape as paths meander through the floodplain. A central mount, situated between the large pools left behind in the extraction of past work, becomes a central monument, providing views across the conservation area. At the foot of the mound, three different experiential takes on activities relating to the water create a sense of connection between the three distinct pools. The first, called the North Flood Plain Pond, connects directly with the Grand River, acting as a vessel by which riverine animals and paddle vessels might enter the site. This armature of the mound presents itself in a series of piers and ramps, the former allowing elevated access for those wishing to fish, and the latter allows kayaker's safe exit and entry points within the site. The second armature, activated along the south bank of the North Cool Pond, invites bathers to enter the water, as this water is segregated from the river, and free from major habitat interference. The third armature, located at the northwest of the larger South Pond, presents itself as a series of tall steps, limiting east of access, as this pool is reserved for wild habitat and fish spawning. These three armatures activate the landscape such that people have the opportunity to differentiate it, and to learn from it intuitively.

FIG. 103 UTILITY LINE THROUGH SNYDER'S FLATS CA.

- **A** FLOODPLAIN CANAL
- **B** PEDESTRIAN BRIDGE
- **C** GRAVEL MOUND
- **D** NORTHERN FLOODPLAIN POOL
- **E** COLD WATER POOL
- **F** WARM WATER POOL
- **G** SOUTHERN FLOODPLAIN POOL
- **H** CAMGROUNDS
- **J** FIREPIT

EXISTING PROPOSED

FIG. 104 RESTORING THE GRAND SITE PLAN



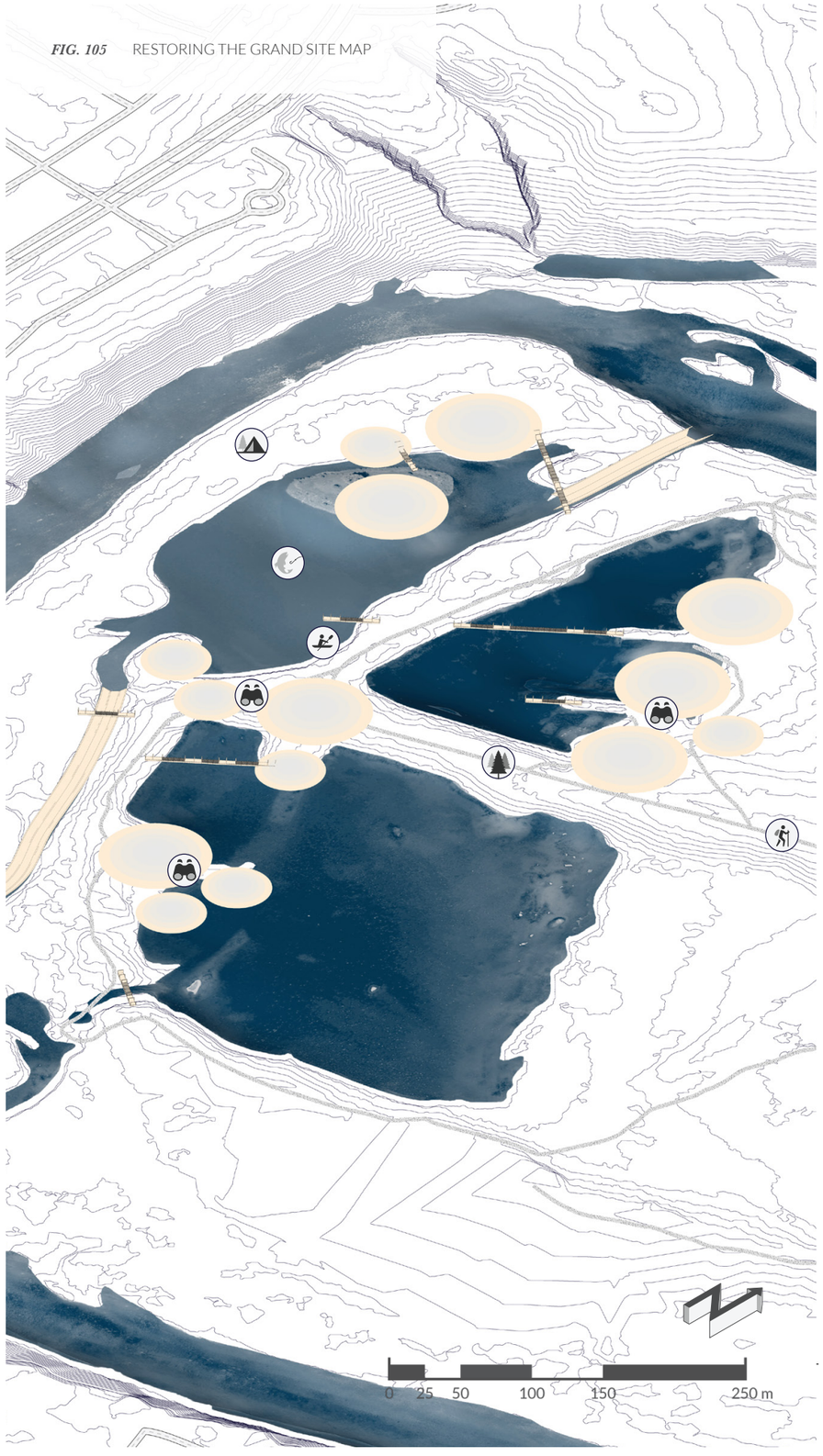


FIG. 105 RESTORING THE GRAND SITE MAP

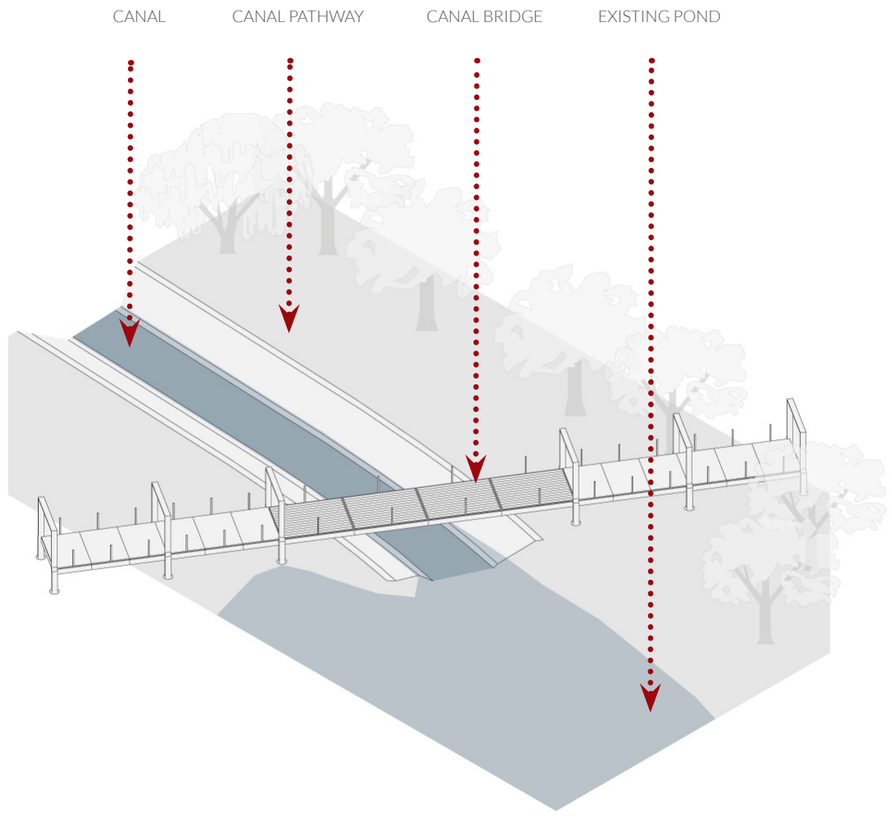


FIG. 106 RESTORING THE GRAND CANAL & FOOTBRIDGE

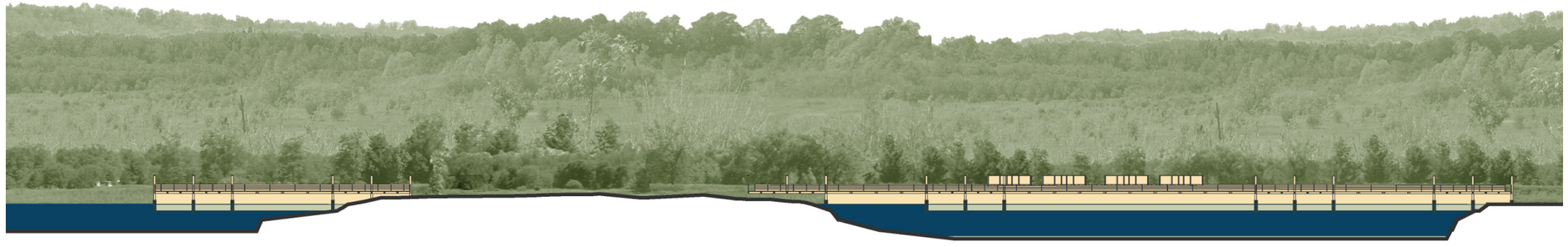


FIG. 107 RESTORING THE GRAND SITE SECTION AA
- CATWALK ELEVATION

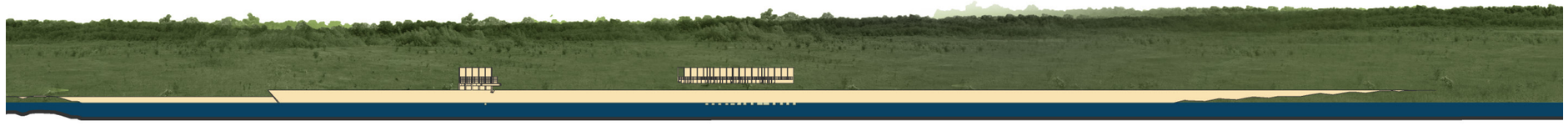


FIG. 108 RESTORING THE GRAND SITE SECTION BB
THROUGH CANAL

FIG. 109 RESTORING THE GRAND VIEW ACROSS NORTH FLOODPLAIN POOL

FIG. 110 RESTORING THE GRAND VIEW ACROSS CAMPGROUNDS

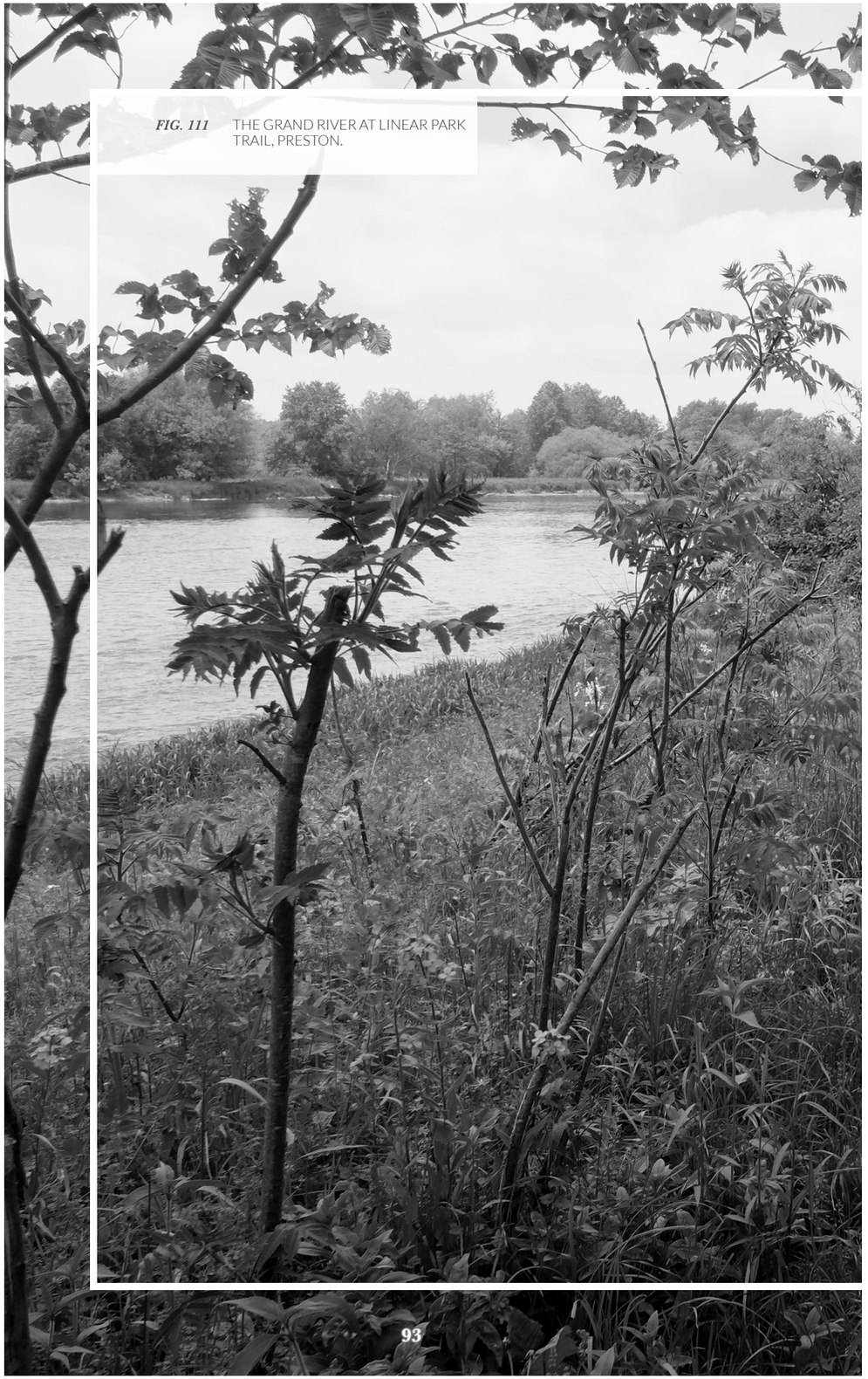
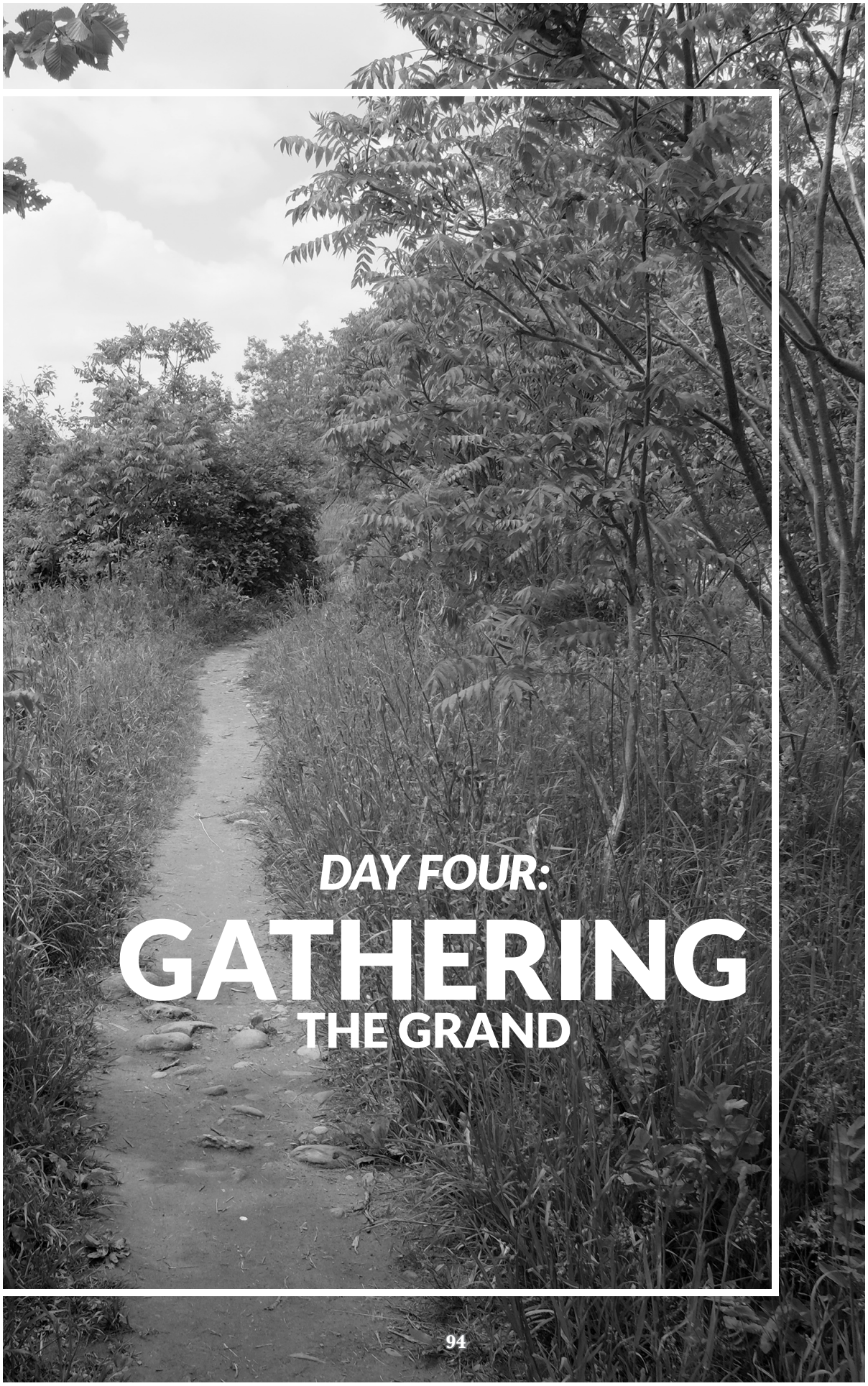


FIG. 111 THE GRAND RIVER AT LINEAR PARK TRAIL, PRESTON.

93



DAY FOUR:

GATHERING

THE GRAND

Gathering the Grand
Overview

gather |ˈgaTHər|
verb

1 [no object] come together; assemble or accumulate;

2 [with object] bring together and take in from scattered places or sources;
- pick up from the ground or a surface.
- collect (grain or other crops) as a harvest.
- collect (plants, fruits, etc.) for food.
- draw together or toward oneself.

3 [with object] infer; understand;

4 [with object] develop a higher degree of.

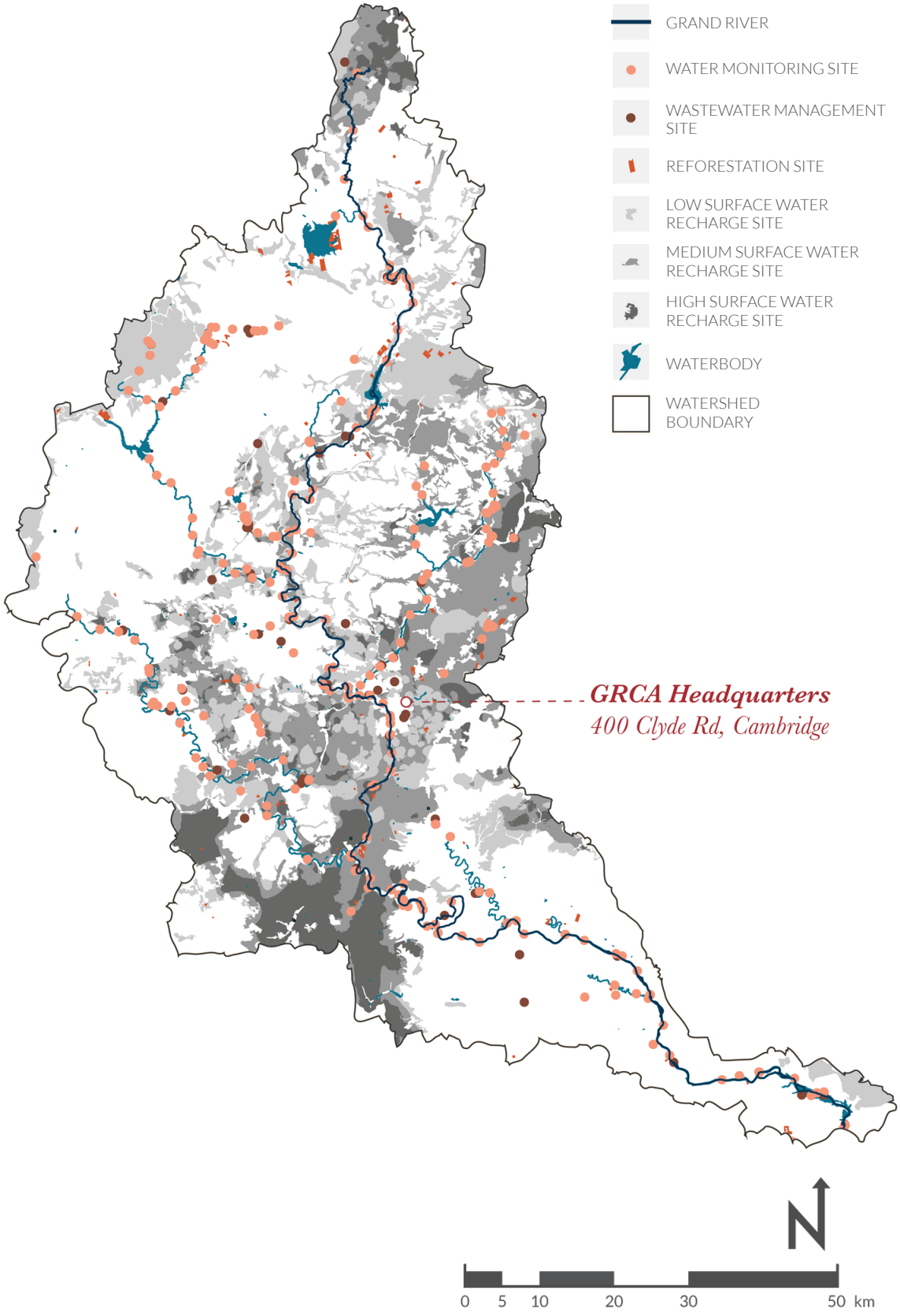
This fourth chapter of Guiding the Grand *travels through the greatest diversity of land-use known to the Grand River, with exposure to a range of historically significant urban, rural, suburban, industrial and conservation conditions all in the same stretch. The peaceful coexistence denotes the greater efforts that come together to manage the Grand River as a resource, and to protect it from the harmful effects that human interaction can result in. As the agency that both guards and represents the entire Grand River system, the GRCA acts in partnership with the federal, provincial and municipal governments, as well as businesses, industries and individuals, in gathering necessary tools and methods to manage the river to an internationally acclaimed degree of accomplishment.*

Here, in the central part of the watershed, it is easier to understand the denaturalizing effects that urban sprawl and industrialization has established on the Grand River Watershed. In this 30km, 5-7hour stretch of the Grand River you pass by a forest fragmented by urban development, cultivation, roads, bridges and other structures and activities.[111] Suburban developments are interrupted by active and inactive gravel mining sites as well as the Waterloo-Kitchener Waste Water Treatment facility. It is here that you will learn about the nature of the Grand River's dynamic existence, the limits and losses that come with development, and the common gathering of its various stakeholders.

RIVER THEORY – The system of a river is one of unity and universality. Because the water of any area travels through all aspects of its physical being, that water is a direct reflection of all activity that occurs. It is paramount that the Grand River be taken care of, as we take care of ourselves by way of it. From early on in humanity's relationship with rivers has held a certain fascination in their contradictory existence, and meditative properties. Frequently associated with life and renewal, the river is also somewhere that death occurs, and the unwanted washed away. According to Buddhist belief, water can be used as a conundrum of thought in order to achieve sudden enlightenment.[112] Moving water holds a reflective place in social understanding, and this relationship spans back through centuries of theory and writing. It is possibly one of many ways in which an individual can interpret greater meaning in a relationship with a river.

Water often facilitates introspection, with its character and composition often borrowed for human interpretation, because "water holds itself forth as a reliable image of passing time and a metaphor for life, especially in the flows of rivers and streams"[113]. The source of the Grand River is unknown to this day, with three proposed fountain heads in the Dundalk region that tend to flow based on the seasons. It had been said that "there is no real source" but rather the river "just bubbles up where it takes the notion"[114] . This idea that the river has no locatable origin begins to reveal the complexities of the Grand River as a dynamic system. This mystery is not singular to any one river, but all, and it has been suggested that the "quest for fresh water helped to draw the map of

FIG. 112 GRAND RIVER WATERSHED WATER MANAGEMENT & MONITORING



the world and to guide human settlement, urban development, and public health concerns"[115]. In the respect one gains through awareness of the unique system of a river, subsistence of the self becomes unanimous with survival of the river.

RIVER USE – Unlike numerous other watersheds, much of the water demand in the Grand is for municipal purposes rather than agricultural, industrial, or commercial uses."[116] The Grand River Watershed, that is the rivers and aquifers, supplies drinking water for its 47 municipalities and the near one million people who live in them. Its waters are rung through waste water management plants, to assure a high level of water quality throughout, and its flows pass through multiple turbines which produce and store hydroelectricity to subsidize various GRCA functions.

The ubiquitous hydro-electrical system Ontario benefits from was proposed out of Kitchener by a man named Adam Beck.[117] Developments through the World Wars picked up, increasing the use of plastics, fertilizers, and other materials and processes harmful to the natural environment. Air and water pollution quickly became a new challenge for the private and public sectors of the Grand River Watershed, having become a major concern from the late 1800s well into the 1930s, at which point "flood and drought conditions finally spurred improvements in policies and programs."[118]

RIVER PRACTICE – The Grand River Conservation Authority (GRCA) plays the largest role in maintaining the Grand River's health, and is known to be the oldest water management agency in operation today. Water management on the Grand River has everything to do with the health and quality of the water, and so all efforts that the GRCA enacts on the Grand River "play a leading role in protecting this vital resource"[119].

The system of dams and reservoirs across the watershed is a necessary asset in keeping the waters flowing at a consistent and safe rate. At hundreds of points across the watershed, water quantities and qualities are measured constantly to ensure that all areas are saturated to a high degree of health. While some source their water through wells and aquifers, "most cities in the watershed depend on the river or wells for their water supplies, and all of them discharge their treated sewage into the river. The GRCA works directly with municipalties to "promote conservation and protect their drinking water sources."[120] With regards to the wastewater that each municpalty produces, the GRCA assists in improving the methods in the treatment of water. In addition to these efforts, the GRCA played a key role in developing a Water Management Plan for the Grand River Watershed.

A WATER MANAGEMENT PLAN – The Water Management Plan for the Grand River Watershed is developed as a means of spreading practical awareness to all memebers of the Grand River Valley, and providing a platform for "voluntary, collaborative process that brings various agencies together as partners" in the practice of water management. These agencies involved include municipalities, First Nations, the CRCA, provincial ministries and federal departments, who are dedicated to aligning their efforts to make the biggest difference concerning three main issues. The three main issues of focus for The Plan are population growth, increasing agricultural industry and climate change. It's aims are as follows:

Ensure sustainable water supplies for communities, economies and ecosystems;
Improve water quality to improve river health and reduce the river's impact on Lake Erie;
Reduce flood damage potential; and
Increase resiliency to deal with climate change.

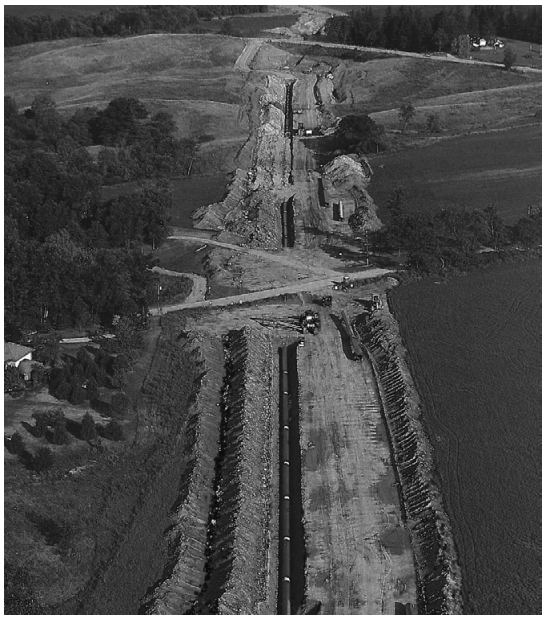


FIG. 113 CAMBRIDGE PIPE LINES INSTALLATION

FIG. 114 AERIAL VIEW OF KITCHENER, WATERLOO & CAMBRIDGE

Gathering the Grand
Points-of-Interest

BLAIR MILLS & SHEAVE TOWER – An offshoot of the west bank of the Grand River, Blair Creek is the location of Blair Mills, also known as Carlisle Mills, a four-storey grist mill built in 1846 by Samuel B. Bowman. Water raced from Bowman Creek and pooled at the dam to turn a 25-horsepower turbine for flour production. In 1876, the 31-foot-tall, 12-foot square base Sheave Tower, also known as the Power tower, was built to house a second supplemental turbine to increase production of flour from the mill. The mill was sold in 1888, was damaged by a great fire in 1928, and rebuilt to produce corn meal and flour until its closing in 2003.[121] The Sheave Tower has been restored in recent years in recognition of the building's importance in the pioneer heritage and engineering innovation of the region, as described below:

The site was earth bermed to direct water through a sluiceway in front of the tower and down an artificial channel or trough. Inside the tower was a water-powered turbine that turned a vertical shaft that ran from the turbine to a horizontal shaft mounted at the top of the tower. The horizontal shaft extended through the east wall where it was attached to an eight-foot diameter cast-iron wheel. The wheel was designed to permit installation of hardwood blocks around the rim. The blocks had deep grooves or sheaves cut into them through which ran a wire cable. This 300 foot-long cable was connected overhead to a similar wheel attached to the west side of the mill. To keep the tower from collapsing from the strain imposed by the cable, a brace cable was installed on the backside of the tower.[122]

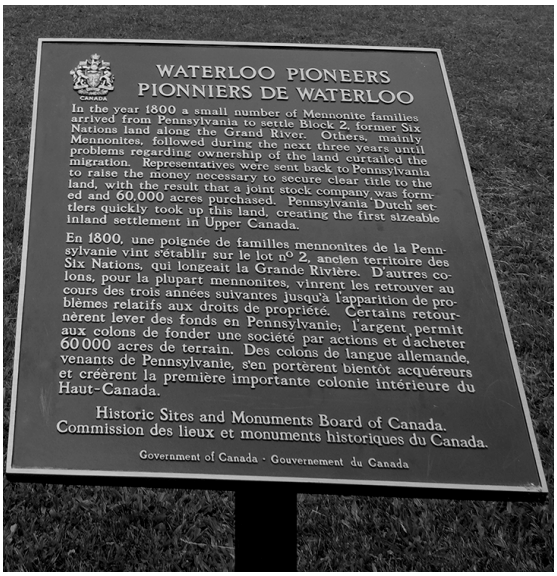


FIG. 115 PIONEER TOWER HERITAGE PLAQUE.

FARMSTEADS & THE PIONEER TOWER – Two farmsteads situated on a ridge overlooking the Grand River were constructed by families who are credited with settling the Region of Waterloo. Samuel Betzner and his son-in-law, Joseph Schoerg, were Mennonite pioneers from Pennsylvania, who came to own lands in Block 2 of the Six Nation's Grand River Valley in 1800. Together, they established the first permanent settlement in inland upper Canada. The land they worked is characterized by rich and fertile soils, dense forests and open meadows. Commemorating these founding families within the region, a stone tower, called the Pioner Tower, was erected between 1925 and 1926 to the west of their farmsteads.[123]

RARE CHARITABLE RESEARCH RESERVE – The Cruickston Charitable Research Reserve is a known site, associated with the convergence of the Grand and Speed Rivers. It is celebrated for a rich cultural history, from countless archaeological finds demonstrative of the woodland peoples of the Grand River, through European settlement, to the present-day diversity in protected habitats for Grand River flora and fauna.[124]

FIG. 116 PIONEER TOWER, NEAR PRESTON.

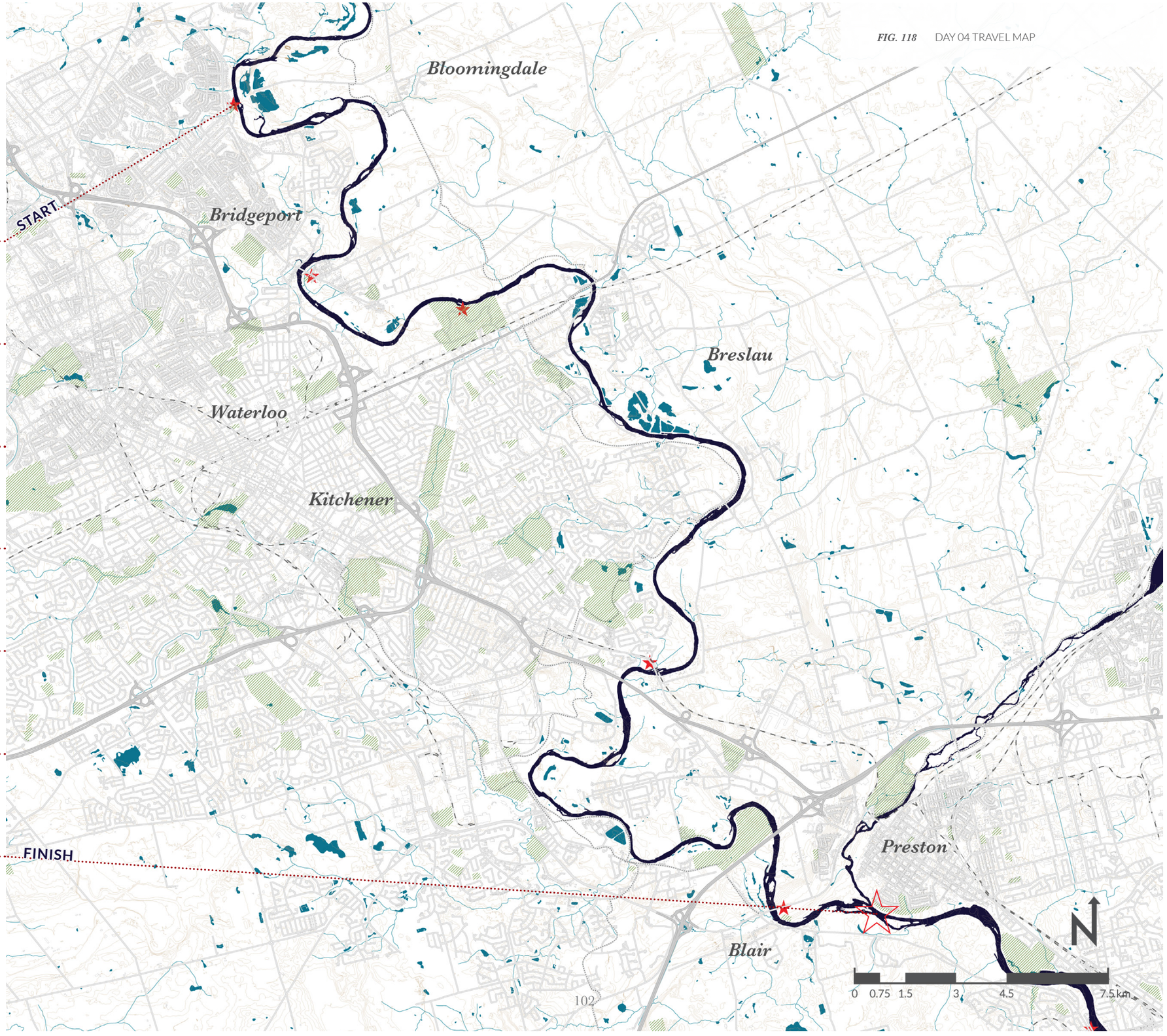
FIG. 117 PIONEER TOWER GATED ENTRANCE.

Gathering the Grand
Timeline and Maps

Trip Hours	*Map Number*	*Activities*	*Place & Point-of-Interest*
	01		**BLOOMINGDALE**
0	02		SNYDER'S FLATS CA
			L BLOOMINGDALE CREEK-KIWANIS PARK
	03		REID'S FORD & CHRISTIAN SNYDER'S FORD
	04		R MELITZER CREEK & LAUREL CREEK
	05		BRG ST BRG-RIVER ACCESS AT EAST END
+1	06		**BRIDGEPORT**
			R LAUREL CREEK, BRIDGEPORT BRG & DIKES
			BINGEMAN PARK AND CAMPING
	07		VICTORIA ST N BRG AKA HWY. 7 BRG
	08		L ROSENDALE CREEK, HOPEWELL CREEK, R KOLB
+2	09		CREEK
	10		**BRESLAU**
			FORWELL GRAVEL CONVEYOR
			L WATERLOO INTERNATIONAL AIRPORT & CREEK
	11		FAIRWAY RD N BRG
+3	12		**KITCHENER**
	13		R IDELWOOD CREEK & L FREEPORT CREEK
	14		FREEPORT BRG AKA KING ST E BRG
	15		CNR BRG/HWY. 8 BRG & MANHEIM WEIR
	16		HOMER WATSON PARK & PETRIFYING SPRING
+4	17		KITCHENER SEWAGE TREATEMENT PLANT
	18		BECHTEL'S FORD & PIONEER MEMORIAL TOWER, LEFT
	19		R DOON CREEK – FERRIE MILL AKA DOON MILLS
	20		R SCHNIEDER'S CREEK & HWY. 401 BRG
	21		**BLAIR**
+5	22		BLAIR & FOUNTAIN ST BRG
	23		BLAIR CREEK- SHEAVE TOWER, BLAIR STONE ARCH
	24		BETCHEL CREEK - HENRY BECHTEL'S SAWMILL
	25		MOYER'S LANDING - PORTAGE ACCESS
+6	26		**PRESTON**
			L SPEED RIVER-SETTLER'S FORK & LINEAR PARK

PARK CAMP DAM BRIDGE RUIN HIKE PUT-IN PORTAGE SWIM FISH WATCH

FIG. 118 DAY 04 TRAVEL MAP



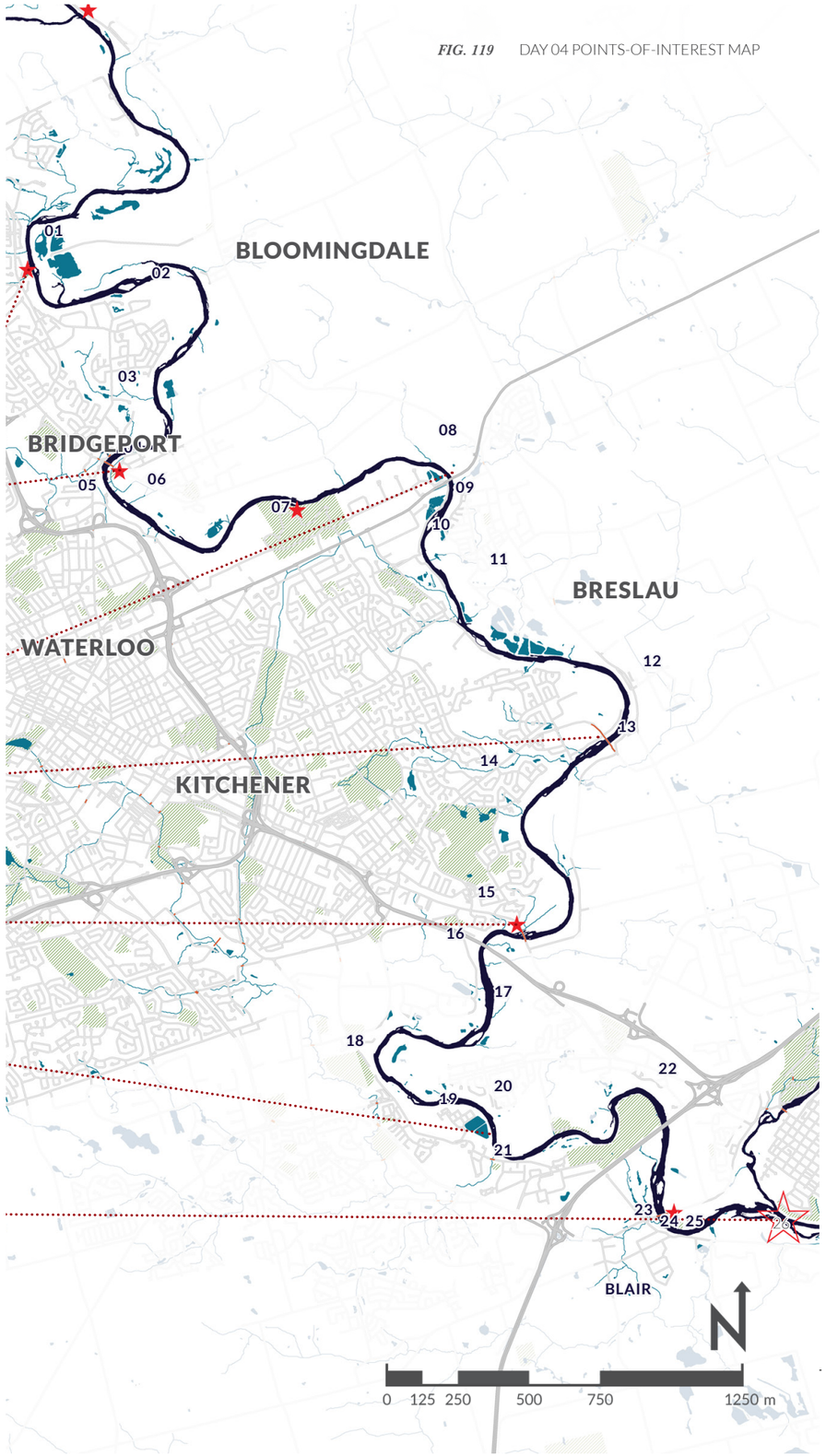


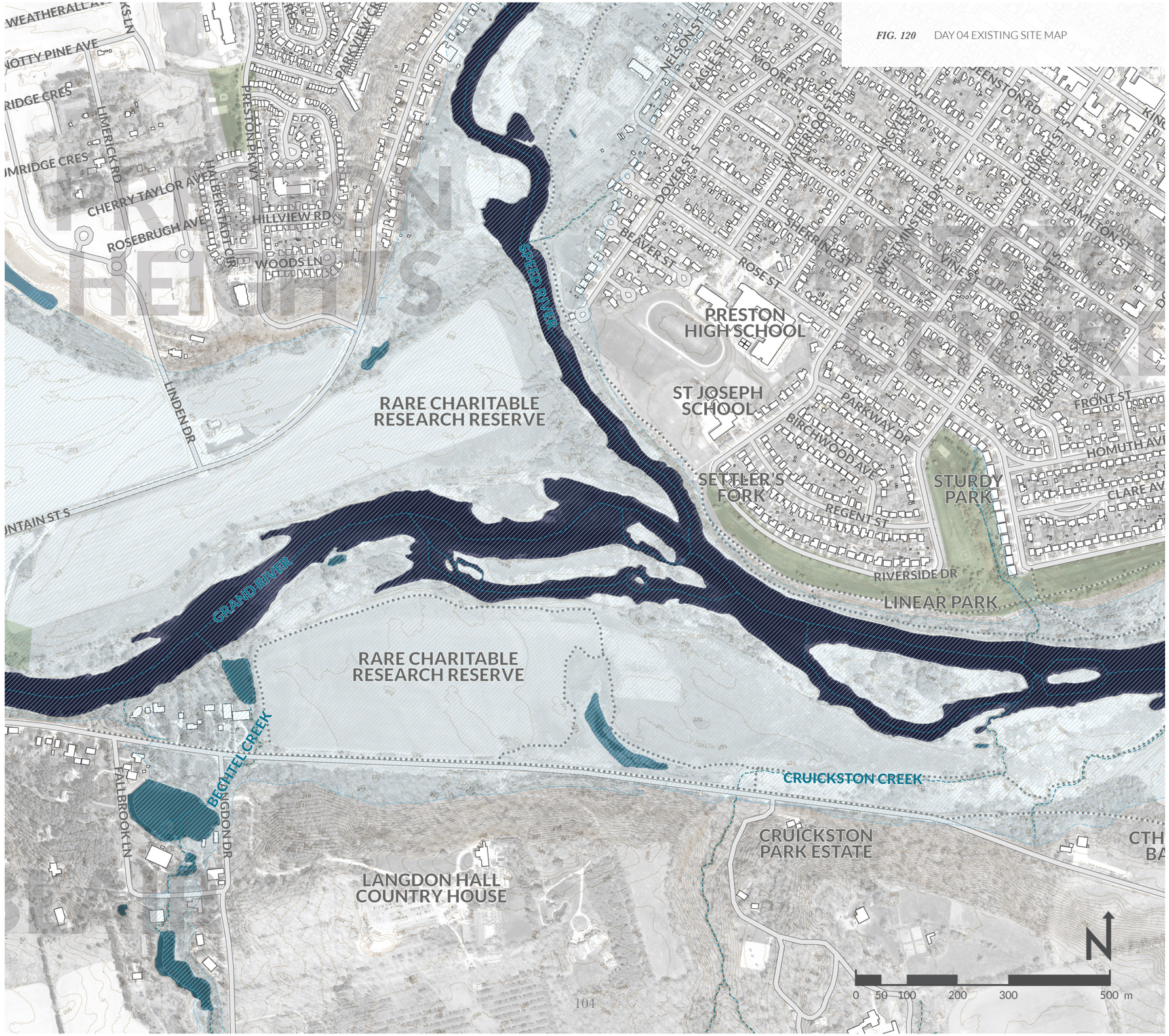
FIG. 119 DAY 04 POINTS-OF-INTEREST MAP

Settler's Fork
at Speed River Junction

At Linear Park, overlooking the junction of the Speed and Grand Rivers, this message is written on a signpost at the site of the Settler's Fork, sometimes called The Confluence: "the dreams of Mennonites and Mohawks, Germans and Ontario Scotch coalesced where the Speed meets the Grand".[125] Though the landscape does not immediately reveal it, this is where of some of the founding moments of permanent settlement on the Grand River took place. For the whole of the Grand River Valley this location represents "an outstanding example of the co-existence of nature at its best within one of the most settled and highly developed regions of Canada" [126]. Evidence has been lifted in the area that show large communities of indigenous occupation thousands of years ago, and the surrounding areas are protected wildlife and research preserves that produced healthy crops for pioneering farmsteads just two centuries ago.

Here it is possible to pick out species of either the Carolinian or the Northern Hardwood Forests here, and the sprawl and scope of the floodplain ecosystem in the area has cultivated one of the widest ranges in plant and animal species across the watershed. The geology of the site ranges hugely or its compact area, with examples of small islands, steep cliffs, wide flat flood plains, shallow pools, and of course, the varied flows of two rivers as they converge[127].

FIG. 120 DAY 04 EXISTING SITE MAP



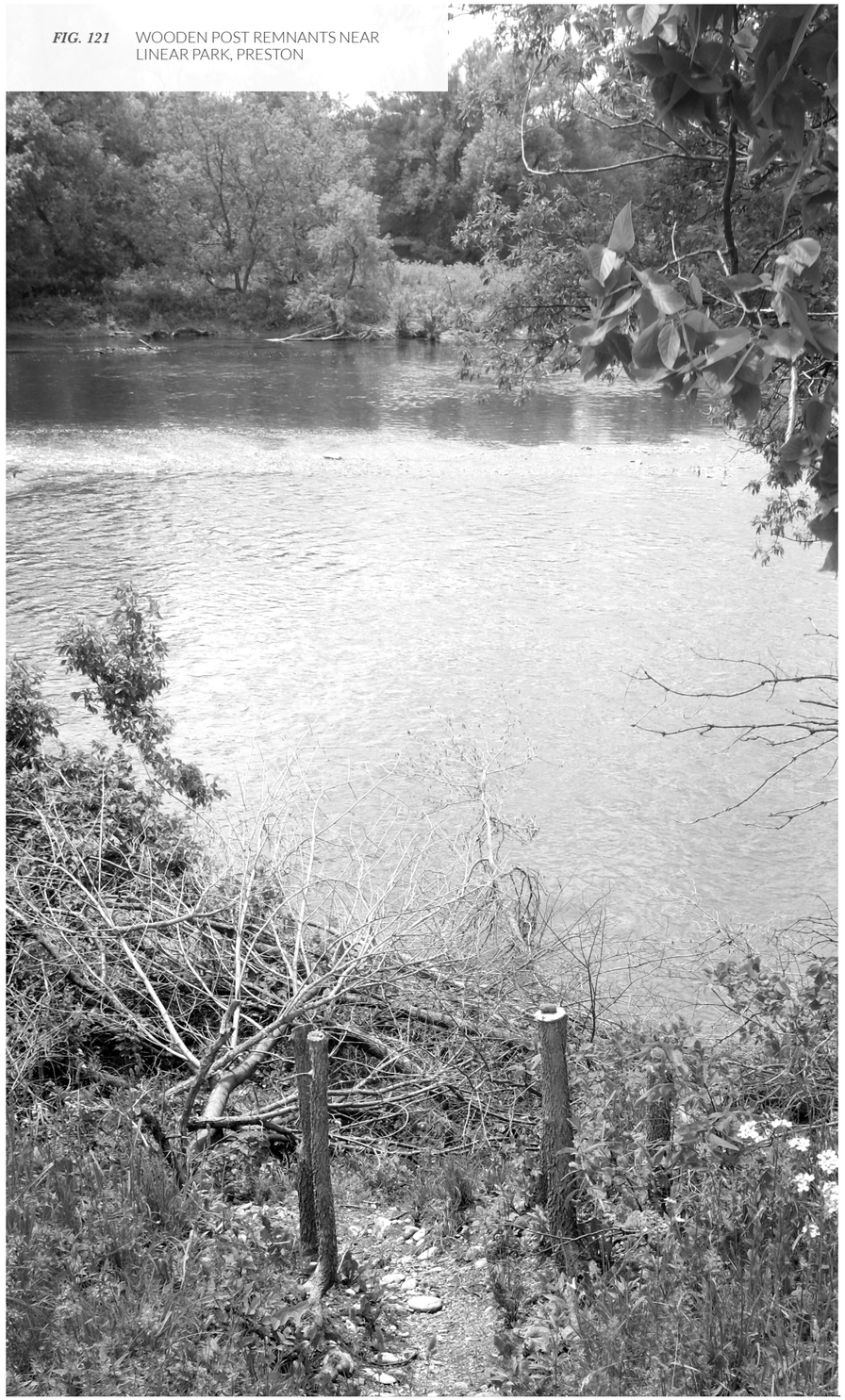


FIG. 121 WOODEN POST REMNANTS NEAR LINEAR PARK, PRESTON

Gathering at the Fork

This site is naturally and culturally significant to the Grand River, and the Junction of the Speed and Grand Rivers denotes the greater system by which the Grand River operates. At the confluence of residential, institutional, and protected recreational landscapes, as well as the literal and metaphorical merging of two of the Grand River's major waterbodies, the response on this site requires a sensitive reflection. Rather than creating something to draw attention away from the moment of the two waterbodies meeting, the design at this site asks the visitor to pay it full attention.

This design is meant to evoke the physical and metaphorical convergence of a greater system, encouraging an experiential sense of connection between all parts of a single whole. The north bank is a manicured park, with functions related to nearby communities. The South and West banks belong to a larger protected conservation area called the RARE Charitable Research Area. The design on the site plays into pre-existing and introduced paths. These paths are articulated in concentric circles that radiate out from the Grand River at the inferred point that the Speed River meets it. Paths of travel and park furniture (benches & lookouts) face toward this central node of the overarching radial grid, positioning all participants on the site toward an invisible focal point. Put-in sites are located to the North, East, South and West, encouraging exploration of all parts that compose and surround the site.

A FLOODPLAIN CANAL
B PEDESTRIAN BRIDGE
C GRAVEL MOUND
D NORTHERN FLOODPLAIN POOL
E COLD WATER POOL
F WARM WATER POOL
G SOUTHERN FLOODPLAIN POOL
H CAMGROUNDS
J FIREPIT

EXISTING PROPOSED

FIG. 122 GATHERING THE GRAND SITE PLAN

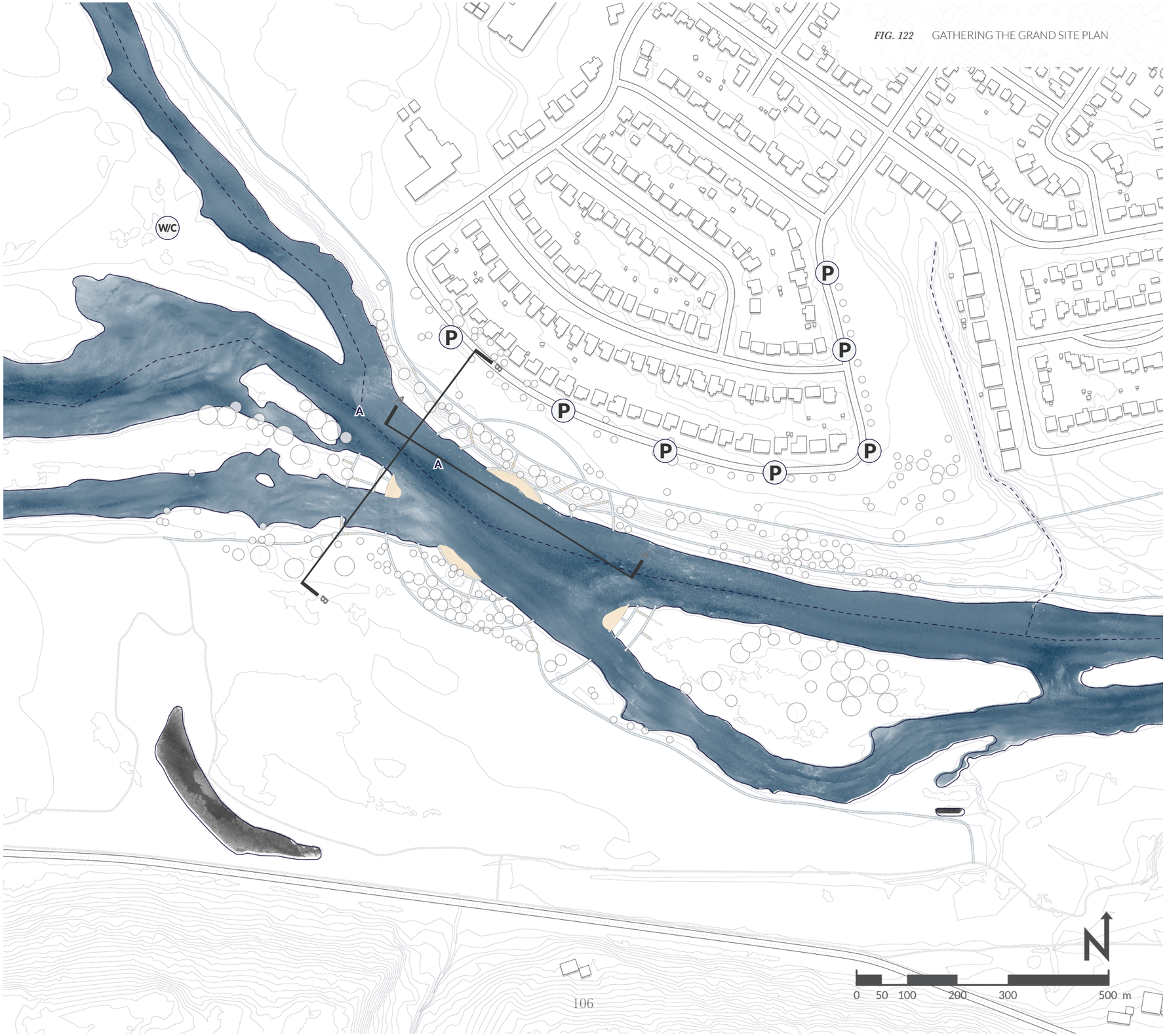


FIG. 123 GATHERING THE GRAND SITE PLAN

FIG. 124 GATHERING THE GRAND STAIR, WALL & PUT-IN

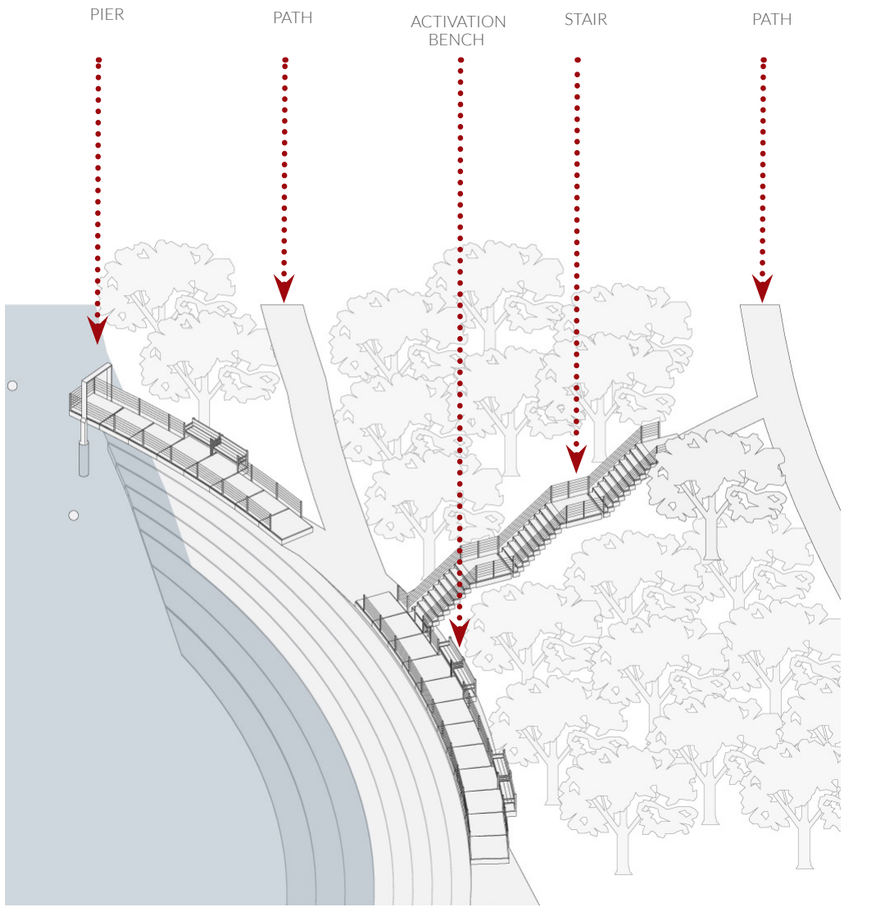


FIG. 125 GATHERING THE GRAND SITE SECTION AA - NORTH BANK ELEVATION

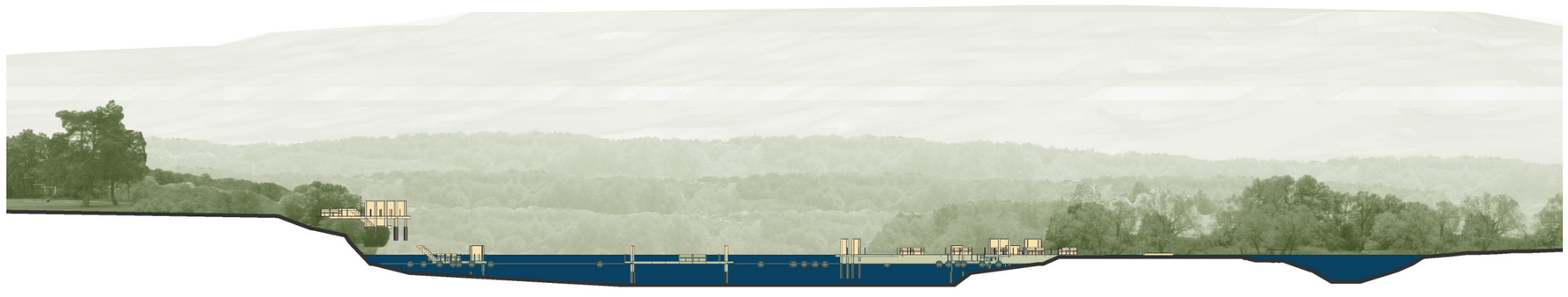
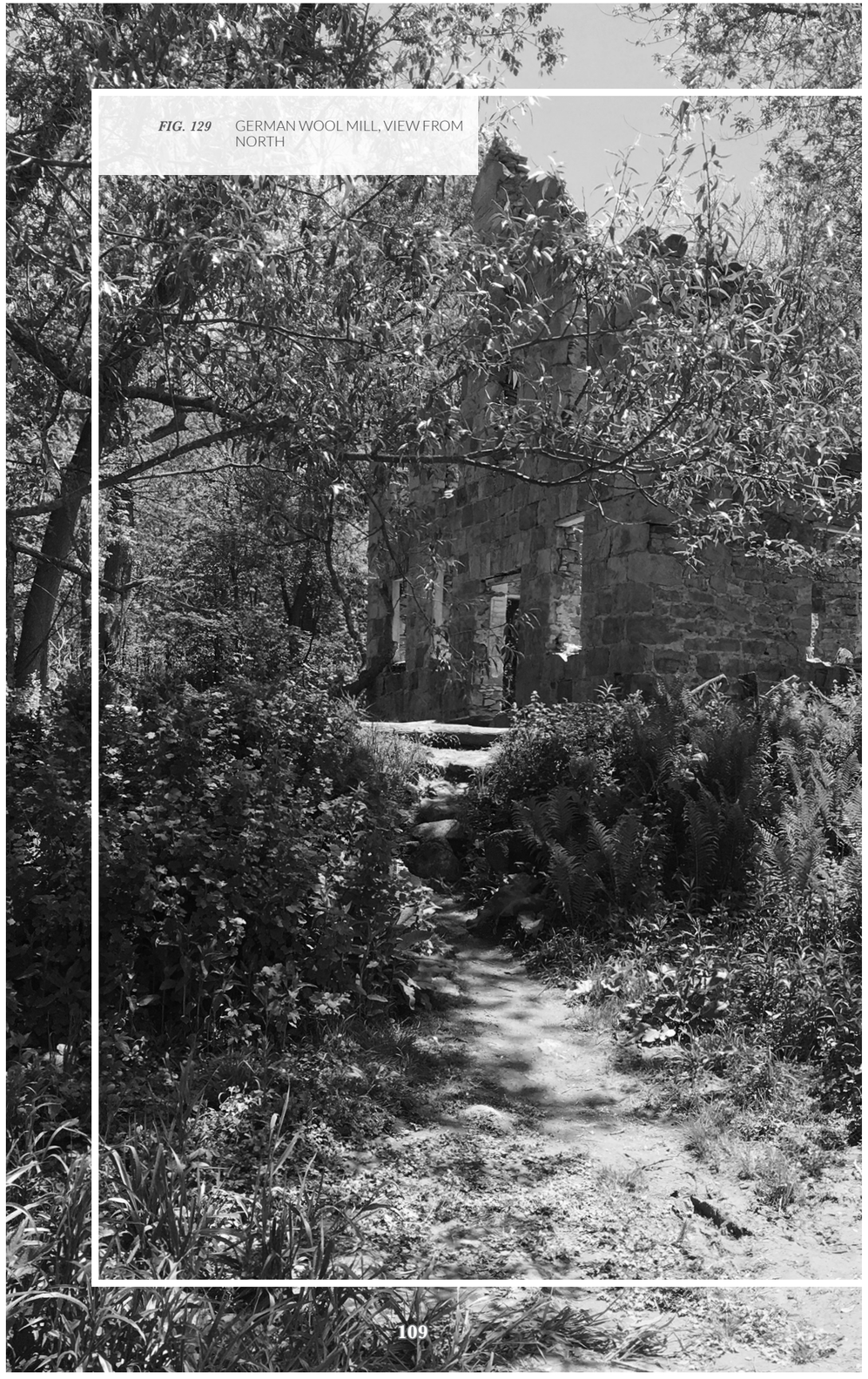


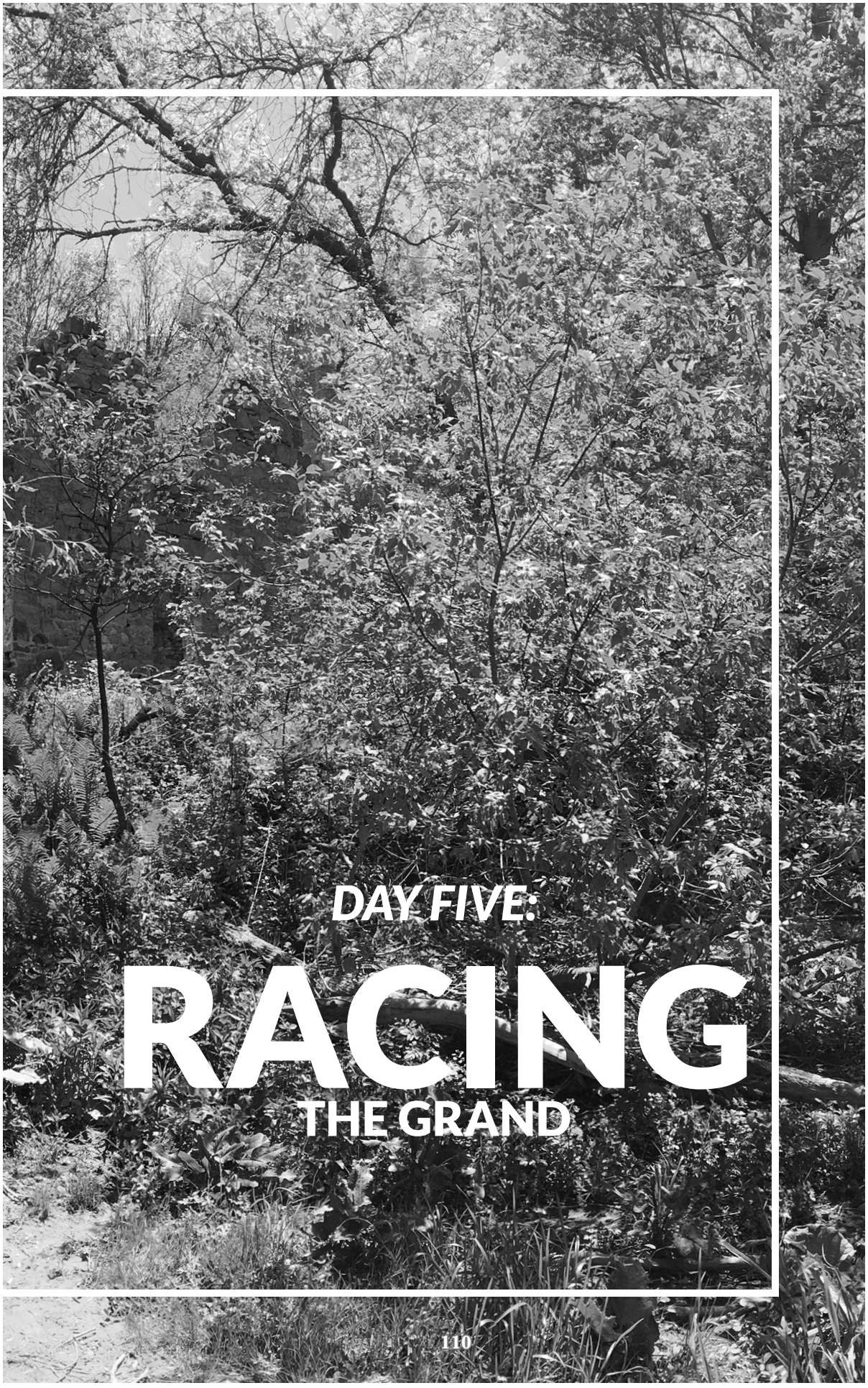
FIG. 126 GATHERING THE GRAND SITE SECTION BB THROUGH GRAND & SPEED RIVERS

FIG. 127 GATHERING THE GRAND VIEW ALONG NORTH BANK

FIG. 128 GATHERING THE GRAND VIEW FROM NORTH BANK PUT-IN

FIG. 129 GERMAN WOOL MILL, VIEW FROM NORTH




DAY FIVE:
RACING
THE GRAND

Racing the Grand
Overview

race |rās|
noun

1 a situation in which individuals or groups compete to be first to achieve a particular objective.

2 a strong or rapid current flowing through a narrow channel in the sea or a river.
`

3 a groove, channel, or passage, in particular: a water channel, especially one built to lead water to or from a point where its energy is utilized, as in a mill or mine.

verb

move or progress swiftly or at full speed.

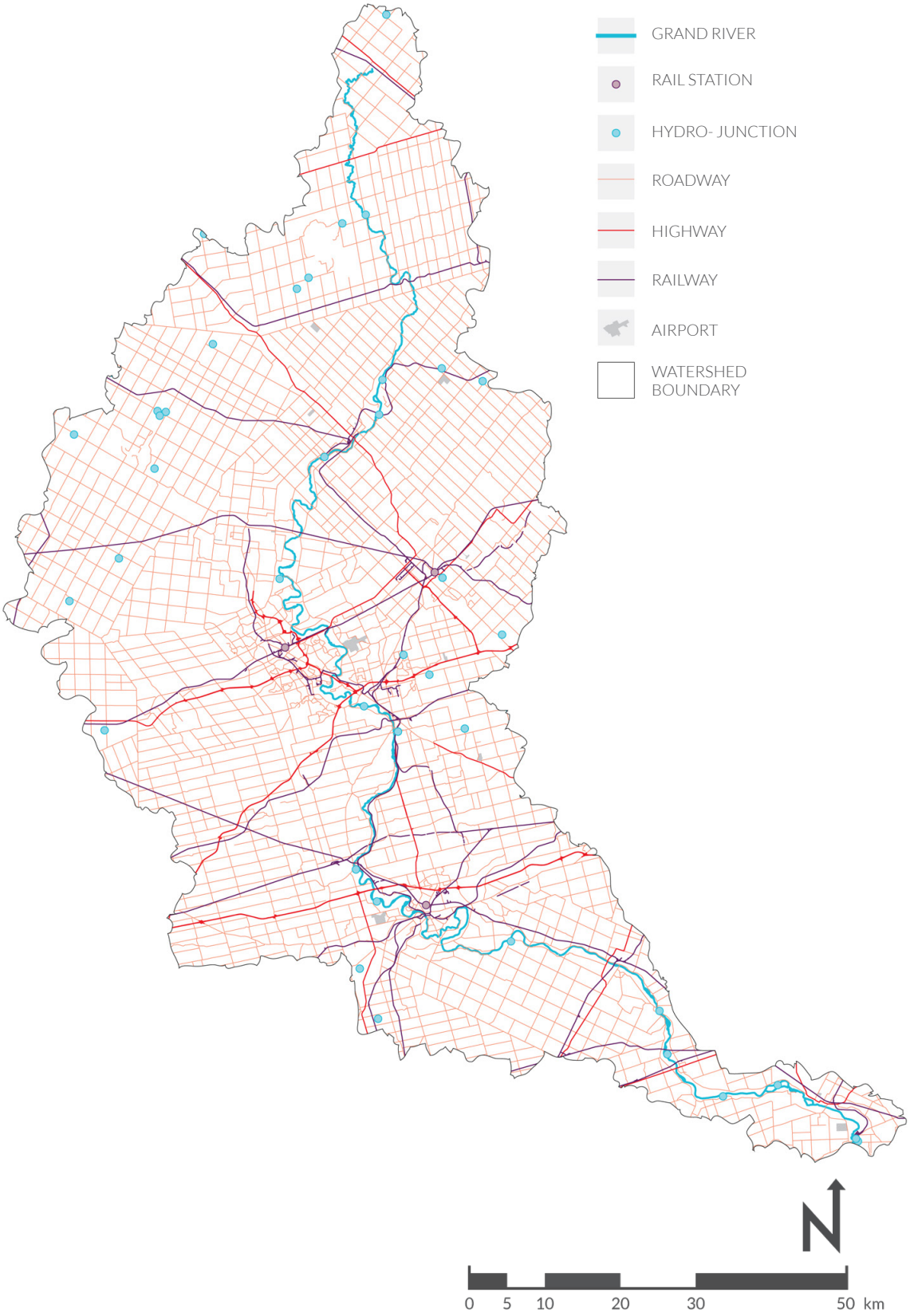
This final chapter of Guiding the Grand explores the infrastructure and development of transportation in the Watershed, beginning with the Grand River as a trade and travel highway for the peoples of the Six Nations, through the mastering of steam and combustion engines in passenger vessels and freight trains, toward our current automobile age. At the height of its population growth, and before the introduction of steam and electrical power, the Grand River was indispensable to the watershed's economy, both in production and transportation of goods and passengers.

This 15km journey down from the junction of the Speed and Grand Rivers takes you through RARE Charitable Reserve, previously Cruickston Lands down toward historic Galt's downtown core. You will come across one large weir with marked portage pull-out and put-in locations on the right, immediately after the large Canadian National Raiway Bridge across the Grand. After passing through Cambridge's Living Levee and three historic bridges, you are plunged into the celebrated Carolinian Forests until you reach your final destination, the abandoned German Woollen Mill at Glen Morris.

THE GRAND RIVER NAVIGATION SYSTEM – The mouth of the Grand River feeds into Lake Erie, a historically well-used gateway from southern Ontario to the United States and beyond. Before the inundation of European settlement, transportation in the Grand River Valley was conducted in shallow boats and canoes, and along the trodden trails of indigenous tribes of the area. Shortly after European arrival, an ailment of modernization called 'Canal Fever' spread in the 1830's to businessmen seeking to streamline the movement of Canadian goods.[128] Six sets of locks and two major canals were built within a few years across the lower Grand River, deepening shallow waters enough to allow larger vessels to travel upriver as far as Brantford.[129] Even though the Grand River is no longer used for industrial or passenger transportation, these developments in and adjacent to the Grand River have altered its physical state and visual identity to present day.

Growing industries of wood, wheat and other goods begot the need for transport down from the townships of Elora, Fergus down to Preston for shipment east to Hamilton or else south through Lake Erie. By 1832, and after several years of proposals and oppositions to the development of the river, the Grand River Navigation Company (GRNC) was formed to manage the development of water transportation, and was responsible the for the rapid construction of infrastructure on the river. Between the towns of Dunnville and Cayuga, near the mouth of the Grand, a dam and feeder canal were built which connected the Grand River to the Wellend Canal, conjoining Lake Ontario to Lake Erie, to the rest of North America by way of other Great Lake ports, and to the rest of the world by way of the St Lawrence River.[130] The company did well, with passenger vessels able to carry travellers regularly between

FIG. 130 GRAND RIVER WATERSHED
TRANSPORTATION NETWORKS



Brantford and Buffalo, New York. By the 1850's there were reportedly around 10 steamers cruising the Grand River, and regular course of barges towed by horses down from Brantford with goods from the northern settlements of the valley.[131] In these early days, the Grand River's waters saw frenetic use that is difficult to imagine in its now pristine waters.

The funding that made dam and lock construction possible in the lower Grand River came, without consent, from the holdings of the Six Nations Iroquois peoples by way of the Lieutenant-Governor of the time, Sir John Colborne. It was believed that the benefits of the eleven locks would influence the natives too, and that the investment of their money would result in more valuable lands and greater prosperity for their longevity in the region. In an unfortunate turn of events, and closely following this golden age in water transportation, steam locomotion was gaining steam, and in 1854 it had reached Brantford.[132] Over the next few decades, railway tracks connected the major cities of the watershed with more convenience than the river ever could. In 1861, the remains of the folded GRNC were given over to the township of Brantford, which sold the locks to a new company, called the Brantford and Haldimand Navigation Company Limited, established in 1872. By this time the infrastructure put in place by the GRNC had begun to crumble, and funds sought from the Province to maintain them were denied, because river travel had become obsolete.[133] In just over forty years, river travel had been eschewed for rail as the better, faster, all-season form of transportation.

GRAND RIVER RAIL – With the introduction to rail transportation, the watershed invested in a major north-south system in the 1850s, providing a faster, more powerful, and increasingly more reliable means for travel, especially in all seasons as compared with river transport. Those towns graced with a connection to the rail system of the Grand River Watershed propelled themselves forward as leaders in population and industry: Guelph, Kitchener, Preston, Galt and Brantford, while older river towns lost economic presence altogether.[134]

By 1870, the Wellington, Grey & Bruce Railway Company was the first active railway in the Grand River Valley, with a route through Elora from Fergus toward Alma. In 1883, the route had been amalgamated with the Grand Trunk railway, and, eventually, in 1923, it was taken over by the Canadian National Railway. This stretch of track experienced issues relating to the soft landscape, often resulting in derailment of cars. Passenger service was discontinued by 1957, and in 1999 the route of the old railway was converted as a continuance of the Elora Cataract Trailway. [135]

1871 marked the incorporation of the Credit Valley Railway, made to compete with the transportation successes of Toronto and the Grey & Bruce Railway. This rail connected to Toronto through Orangeville, with branches to Galt, Kitchener, Waterloo, Elora and St. Thomas. Soon after its completion in 1881, the line was amalgamated with the Ontario and Quebec Railway, which leased it to the Canadian Pacific Railway. Like the Wellington, Grey & Bruce Railway, this track was abandoned in 1988, and the right of way was incorporated by 1993 into the Elora Cataract Trailway.*[136]*

Between 1917 and 1955, the Lake Erie & Northern Railway once connected Cambridge to Lake Erie with an electric line, carrying passengers and freight in trolleys similar to streetcars. In 1991 the right of way was bought by the Grand River Conservation Authority and converted into the Cambridge to Paris Rail-Trail in 1994, the first abandoned Ontario rail right of way to be used for recreation.[137]

RARE CHARITABLE RESEARCH RESERVE – As mentioned in the previous section, *Gathering the Grand*, this site was originally known as the Cruickston Charitable Research Reserve, the RARE Charitable Research Reserve is located on the western side of Cambridge, south of where the Speed and Grand Rivers converge. Archaeological finds are riddled throughout the site as far back as 4500 BP, as it was historically an active trading point for hunter-gatherer settlements in the region. The space is celebrated as one of the largest urban green spaces in Canada, whose array of vegetation and wildlife is treasured and protected though an Environment Management Plan.[138]

FIG. 131 ROAD DEVELOPMENT IN THE GRAND RIVER WATERSHED

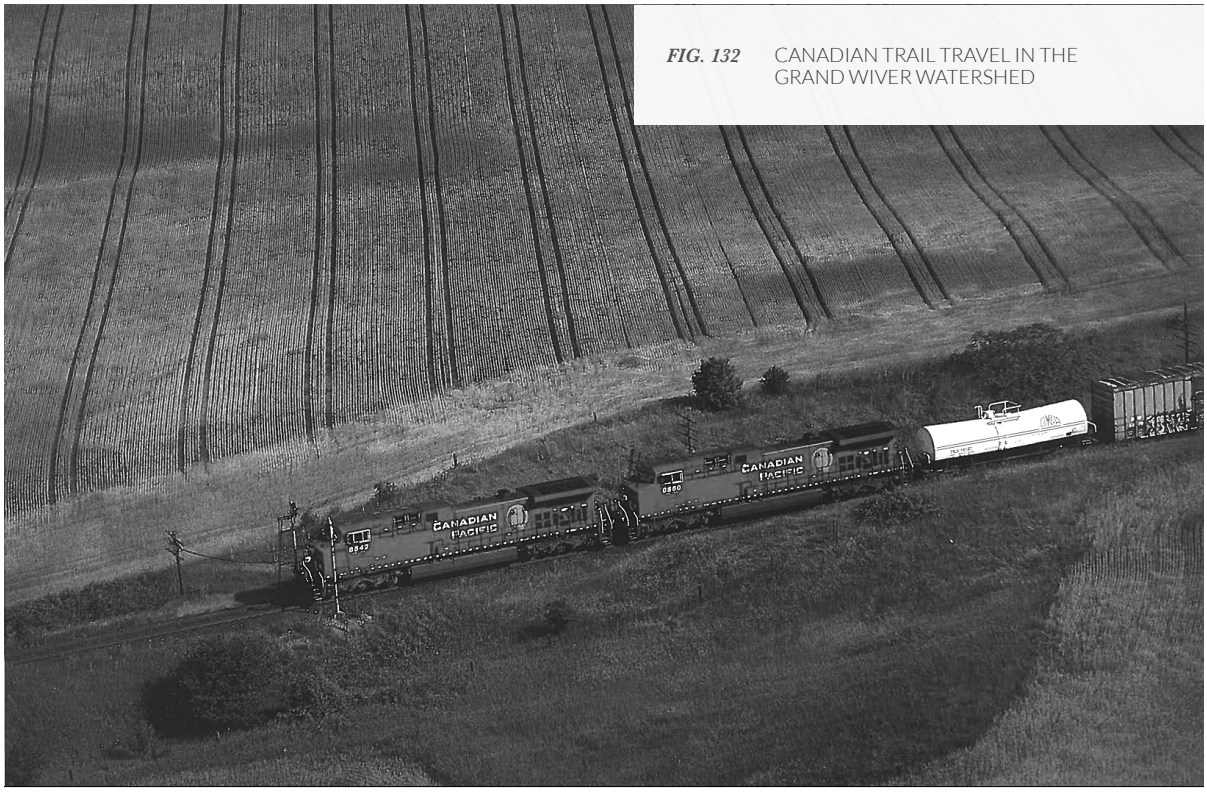


FIG. 132 CANADIAN TRAIL TRAVEL IN THE GRAND WIVER WATERSHED

Racing the Grand
Points-of-Interest

CAMBRIDGE BRIDGES & PARKHILL DAM – Park Hill Dam was built by John Cain, a civil engineer from Montreal, who was hired in 1839 by Robert Dickson. Together, they designed a dam to be built across the Grand River. As part of the project, a canal was dug along the east bank of the river. This elaborate millrace was connected to the mill pond which formed behind the dam and provided the water power needed to run several mills. This wooden dam lasted 71 years before the blasting of an ice buildup by the Town of Galt damaged it. The Galt Gas and Light Company, who owned the dam at the time, wanted the Town of Cambridge to pay for the damages, but decided to build a new concrete dam instead. Construction began August 1, 1913 by local contractors, Thomas and Hancock. It is 88 metres (288 feet) in length, 5.5 metres (18 feet) wide at the base and 3 metres (10 feet) high. The old wooden dam was left in place 11 metres (35 feet) north because it was too difficult to remove it. [139]

HISTORIC GALT MILLS – Galt is a recognized downtown region within the greater municipality of Cambridge, and during the height of its economic success, it was celebrated as an industrial centre on the Grand River. Many of the Scottish-built mills of this booming period still stand, reimagined as shops, apartments, and even institutions that feed the new economies of the city.

CAMBRIDGE MILL (DICKSON MILL or RIVERBANK MILL) – Located northeast of Parkhill Bridge, Cambridge Mill was originally built in 1842 as a grist mill, known then as the Dickson Mill, sometimes called the Riverbank Mill. Constructed from limestone, it was proposed to further develop industry on the banks of the Grand River. It operated through several fires before going idle, like nearly all mills on the river, and in 1899 was converted to house the Galt Gas and Light Company, and in 1980 it was transformed again into a restaurant. [140]

TURNBULL MILL (WARDLAW MILL) – Remains of the Turnbull Mill, originally known as the Wardlaw Mill constructed in the mid 1800s, are now integrated into Mill Race Park. The mill was bought by the Turnbulls in 1895, and rebuilt after a fire in 1897, and remained in operation until the devastating floods of 1974.[141]

WATERLOO ARCHITECTURE (RIVERSIDE SILK MILLS) – Southwest of the Main Street Bridge, the University of Waterloo School of Architecture has been housed in the old Riverside Silk Mills complex since 2004. The 1920's industrial textile building is more recent than other mills of the area, its construction from red brick masonry rather than the native limestone typical to the area. The mill was once a hub for the economic development in Galt and Cambridge.[142]

DUMFRIES MILL (GALT WOOLLEN FACTORY) – Just north of the southern strip of the Living Levee on the east bank of the Grand River, Dumfries Mill, also known as the Galt Woollen Factory was constructed between 1843 and 1851, and from 1881 it was the headquarters for Tiger Brand Knitting company before it moved across the street in 1904. It underwent renovations more recently, and now houses offices and apartments, as well as a pumping station for the GRCA. The building is the oldest surviving textile mill in the area. [143]

CAMBRIDGE'S LIVING LEVEE & MILL RACE PARK – After the resurgence of flooding in 1974, and millions of dollars in damages to the historic downtown core of Galt leaving many architectural relics of the past damaged beyond repair, Cambridge's relationship with the Grand River would be transformed. A design competition was organized, with the hopes of retaining some of the industrial mills that characterized Galt, while strengthening the water's edge to withstand future inundation. The answer was to rebuild Cambridge's banks into a 'living levee', designed to protect historic downtown Galt from any further damages and loss[144]. The disaster had brought forward the need for better understanding and regulations for floodplain development, as well as an innovative thinking in the ways of living with the river.

FIG. 133 PARKHILL BRIDGE & DAM.

FIG. 134 TURNBULL MILL & MILL RACE PARK.

FIG. 135 CAMBRIDGE LIVING LEVEE.

Racing the Grand
Timeline & Maps

Trip Hours	Map Number	Activities	Place & Point-of-Interest
	01		**PRESTON**
0	02		L SPEED RIVER-SETTLER'S FORK & LINEAR PARK
	03		R CRUICKSTON CREEK & DEVIL'S CREEK & WATERFALL
	04		**CAMBRIDGE**
	05		RARE CHARITABLE RESEARCH RESERVE
	06		LIMESTONE CLIFFS
+1	07		RIVERBLUFFS PARK - PORTAGE ACCESS
	08		CNR RAILWAY BRG
	09		PARKHILL WEIR & BRG - PORTAGE ACCESS
	10		DICKSON MILL AKA CAMBRIDGE MILL
	11		**GALT**
+2	12		CAMBRIDGE FLOOD PROTECTION DIKES
	13		TURNBULL WOOLEN MILL RUINS AKA MILL RACE PARK
	14		CAMBRIDGE LIVING LEVEE, LEFT
	15		MAIN ST BRG
	16		RIVERSIDE SILK MILLS AKA UWSA
+3	17		GALT POST OFFICE
	18		L MILL CREEK & TUNNEL- GALT & ABERFOYLE CREEKS
	19		CONCESSION ST BRG
	20		DUMFRIES MILL AKA GALT WOOLEN FACTORY, LEFT
	21		PIER REMAINS FROM L.E. & N. RAILWAY BRG
+4	22		BARRADELL'S LOFTS AKA OF GALT BOILER FACTORY
	23		GTO GAS BAR - PORTAGE ACCESS
	24		CAMBRIDGE TO PARIS RAIL TRAIL HEAD
+5	25		MOFFATS CREEK-SIR WINSTON CHURCHILL PARK
	26		WEST RIVER RD BRG – RIVER ACCESS UPSTREAM
	27		R SHEPS SOUTH CREEK & L AULDER CREEK
	28		GLEN MORRIS
+6	29		GERMAN WOOLLEN MILL, LEFT

PARK CAMP DAM BRIDGE RUIN HIKE PUT-IN PORTAGE SWIM FISH WATCH

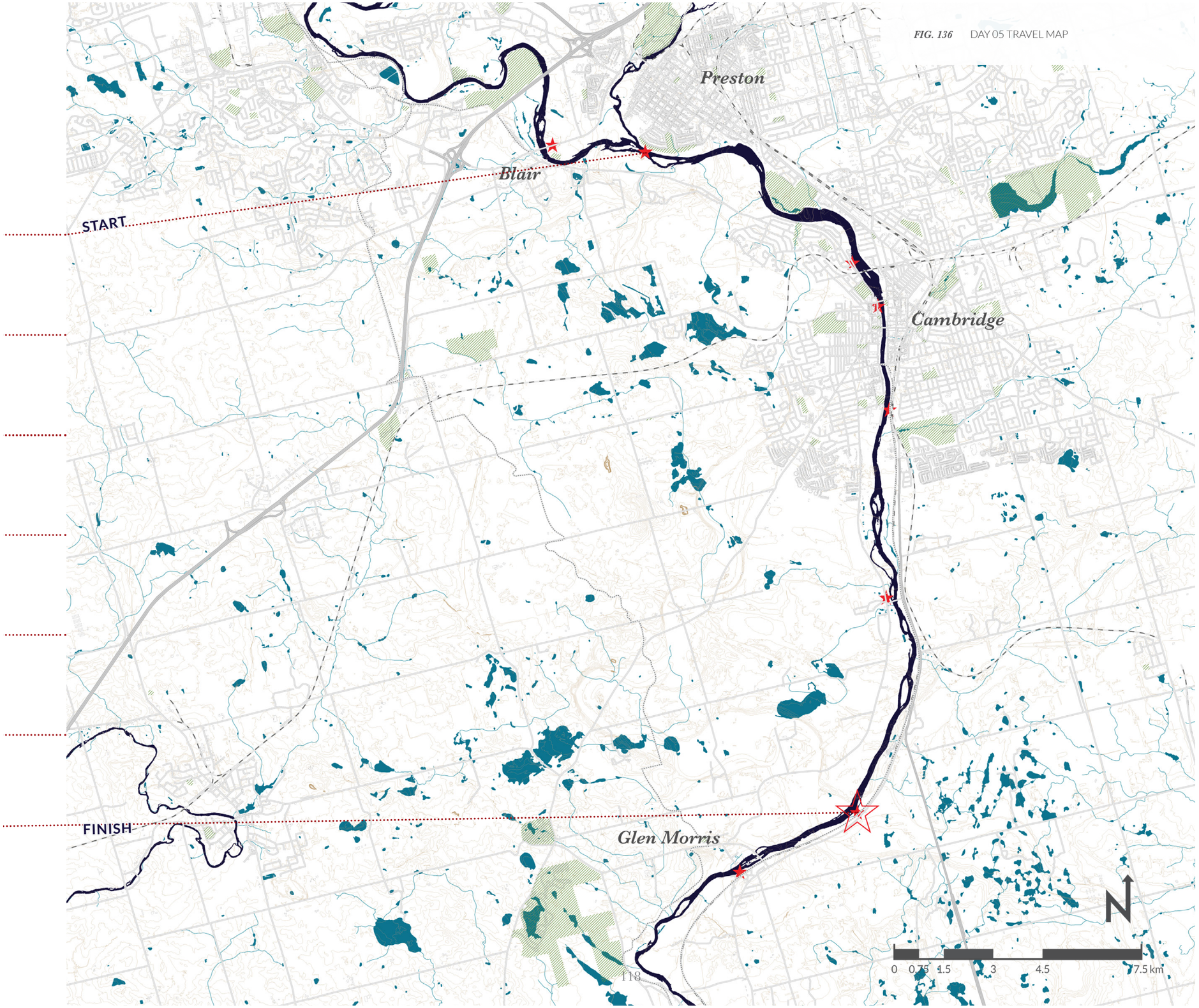


FIG. 136 DAY 05 TRAVEL MAP

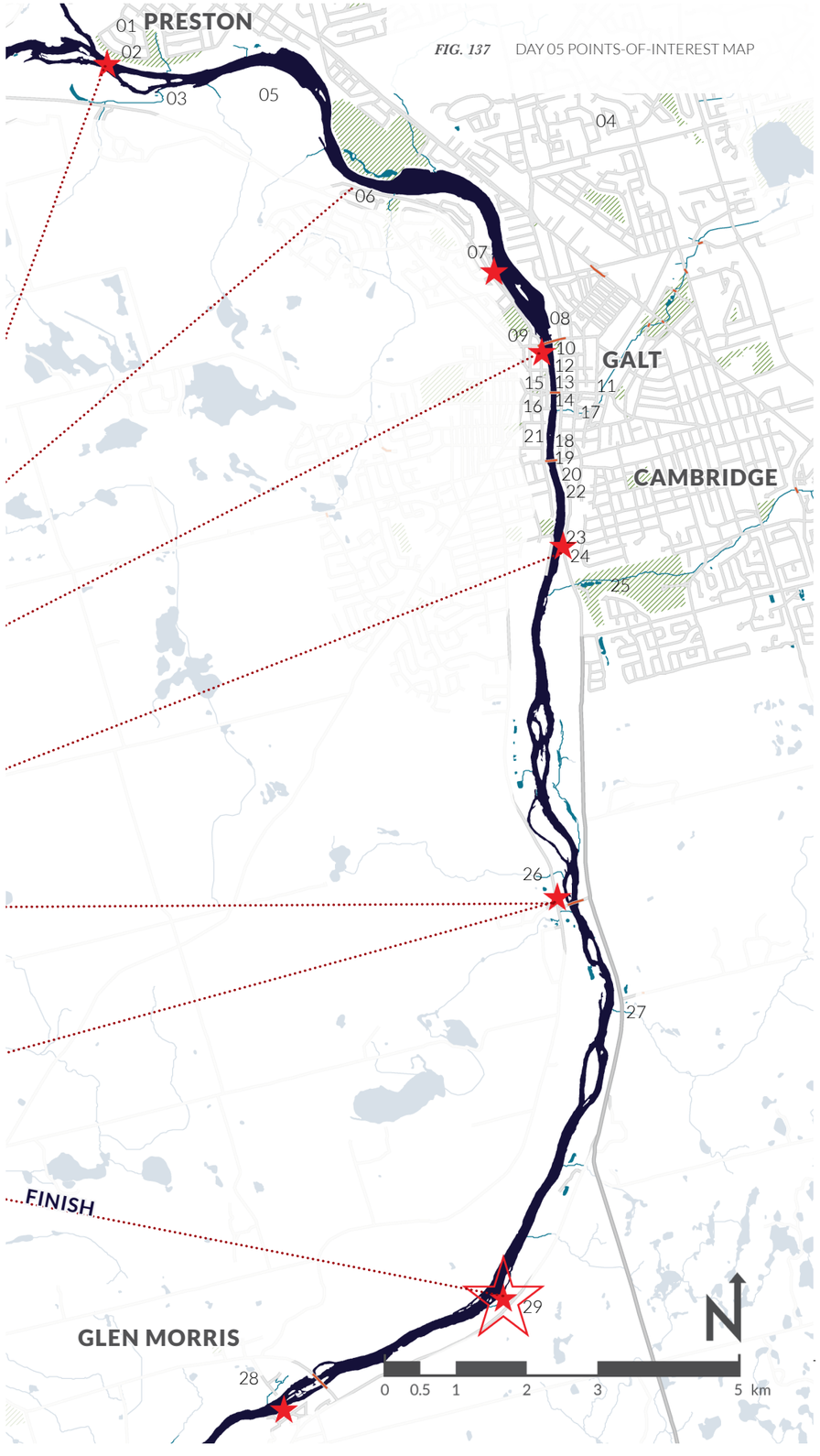


FIG. 137 DAY 05 POINTS-OF-INTEREST MAP

Glen Morris Mill

Glen Morris Mill, also known as the Old Stone Mill or the German Woollen Mill, was built in 1867 for Sydney and Alva German for the milling of raw wool into fine cloth. The turbine used to generate power from the Grand River in this mill was the largest in the area, though it is no longer found on the site. The mill was converted into a 13-bedroom hotel called Grand River Lodge when small mill industry waned on the river, and the construction of the Lake Erie and Nothern Railway between 1913 and 1914 cut road access off from the mill entirely. The building was sold off, and eventually landed under the ownership in the South Dumfries Township until it was sold again in the 1980's.[145] Through the various changes of hand, the mill has lost a great deal of its original construction, so that all that is left standing are its four stone walls. The railroad that separated the mill from its township has since been torn out to create a recreational hiking path, called the Cambridge to Paris Rail Trail. This path has encouraged many visitors travelling by bicycle and foot in addition to the paddlers who general aim for the mill as a resting stop.

Manitoba Maple trees were introduced along the banks of the Grand River in efforts to avoid further erosion. The roots of these maples take quickly and grow rapidly with a short life span, making them optimal for soil stabilization. The Glen Morris Mill had been inundated with the roots and growth of these trees until recently, when the bulk of the growth was removed, leaving the structure in even poorer condition. With minor restorative efforts, the stone walls of the mill could be made to last longer as relics of the Grand River's past for the enjoyment of paddling and hiking visitors.

FIG. 138 DAY 05 EXISTING SITE MAP

FIG. 139 GERMAN WOOLEN MILL
WINDOW OPENING DETAIL

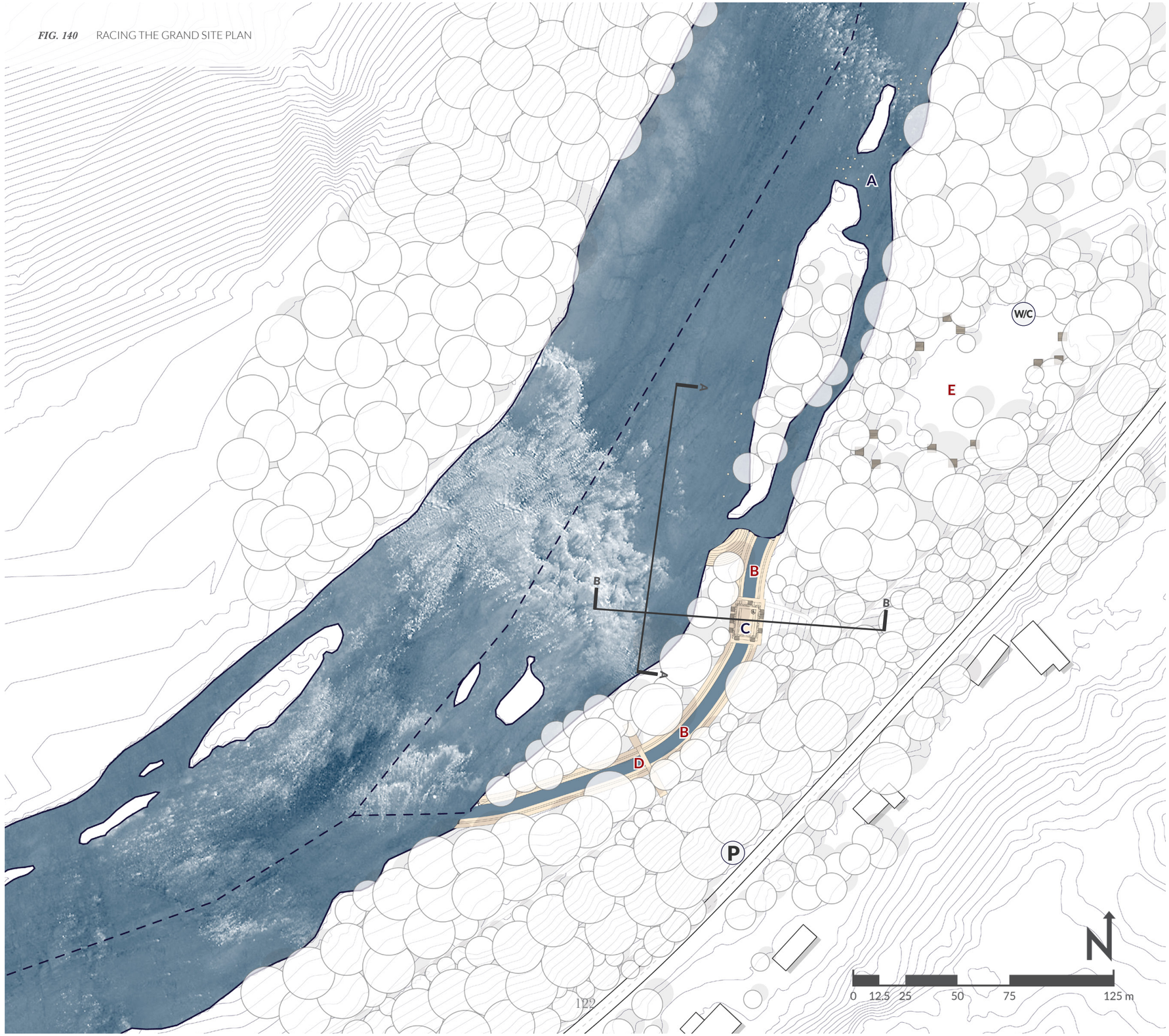
Racing the Mill

Most of the ruins and remains of old mills on the Grand River have fallen to greater disrepair than the site of the old German Wool Mill. This site stands an excellent and exciting example of typical stone mill architecture as it was built to last. Proposed for this site, the remaining structure would be reinforced and subsidized with a simple steel skeleton from the inside, so as not to disrupt the powerful character of the ruin. From this framework, platforms carry visitors around the perimeter of the four walls, with platforms carried out through each window opening. These platforms are intended for camping and site seeing. A simple shallow canal brings the mill race back to life, carrying a controlled flow of the Grand River's waters through the basement of the Glen Morris Mill, allowing paddlers to experience the mill the same way river had so long ago. Pathways connect to the greater Rail Trail and along the edges of the canal toward a small pedestrian bridge to the west, and toward a supplementary campground to the east.

A ORIGINAL MILL RACE PATH
B MILL RACE CANAL
C GLEN MORRIS MILL RUINS
D PEDESTRIAN CANAL BRIDGE
E CAMPGROUNDS

EXISTING PROPOSED

FIG. 140 RACING THE GRAND SITE PLAN



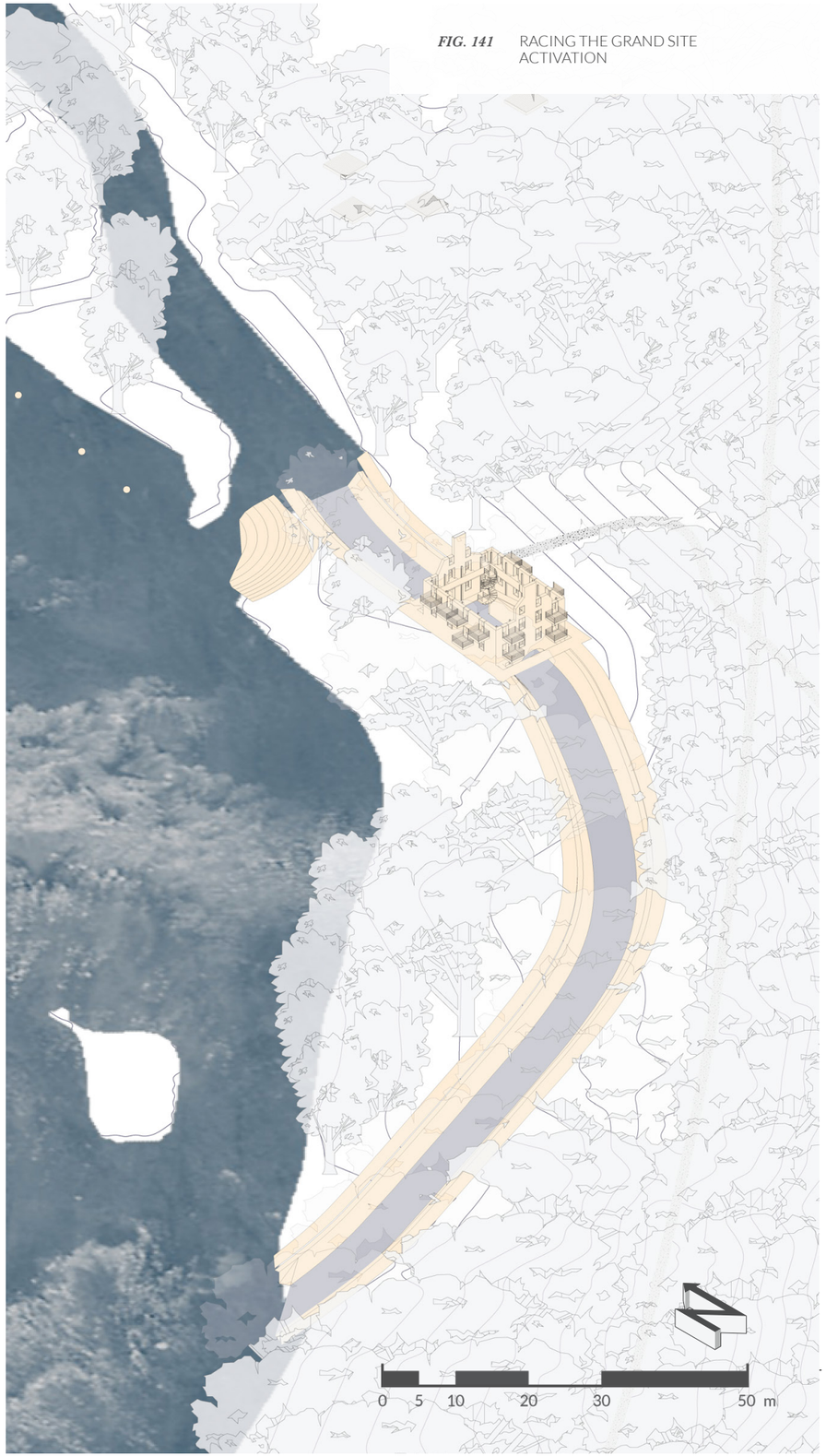


FIG. 141 RACING THE GRAND SITE ACTIVATION

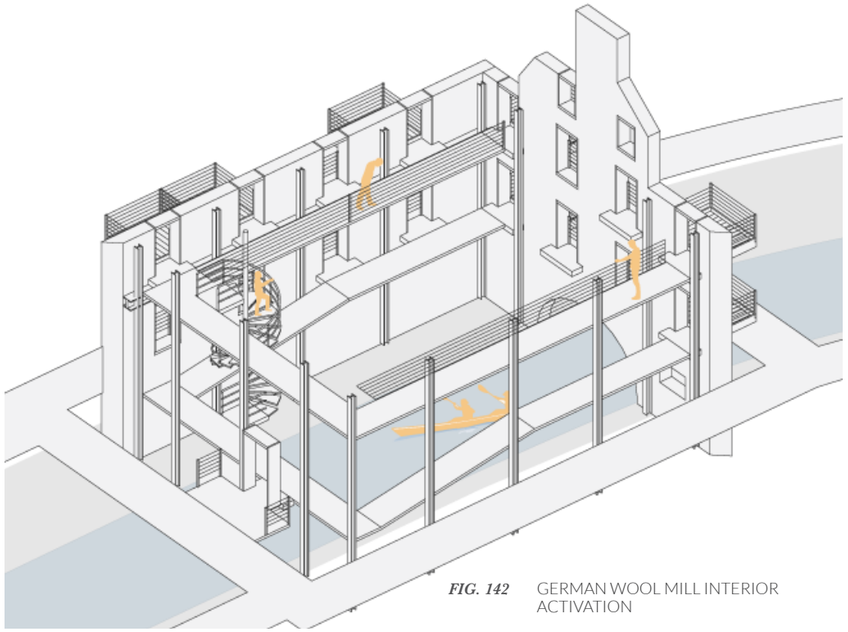


FIG. 142 GERMAN WOOL MILL INTERIOR ACTIVATION

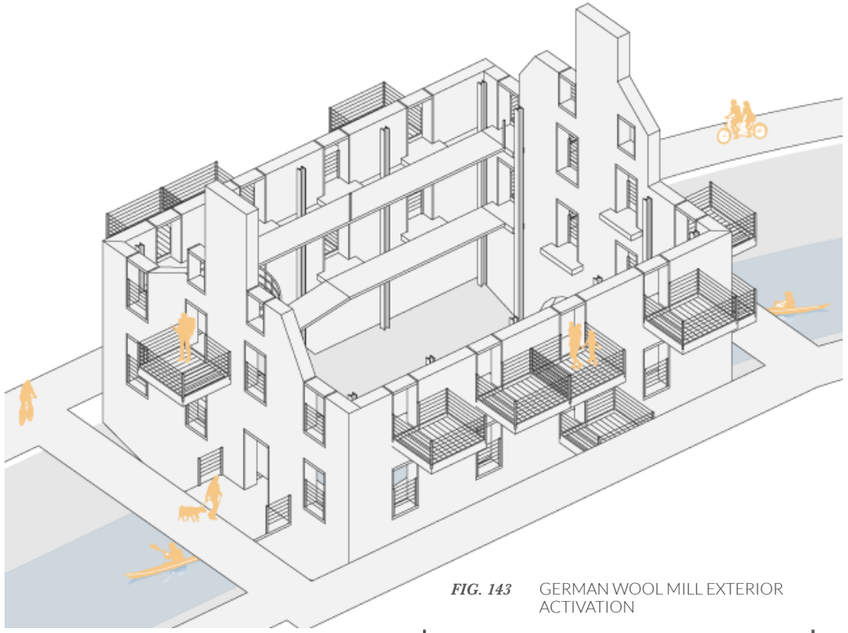


FIG. 143 GERMAN WOOL MILL EXTERIOR ACTIVATION

0 2 4 8 12 20 m

FIG. 144 RACING THE GRAND SITE SECTION AA & MILL ELEVATION

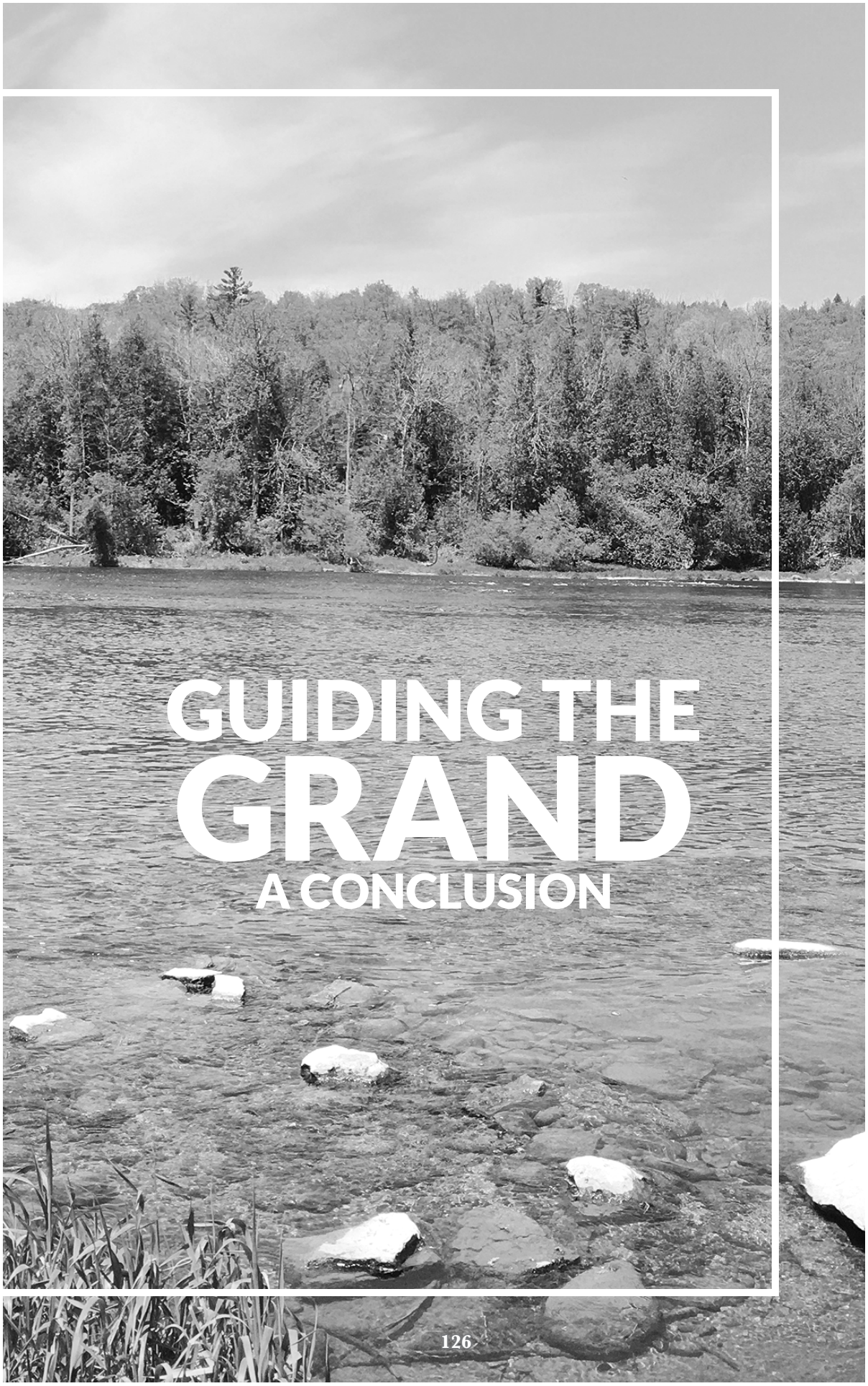
FIG. 145 RACING THE GRAND SITE SECTION BB THROUGH MILL

0 5 10 20 30 50 m

FIG. 146 RACING THE GRAND VIEW ALONG CANAL

FIG. 147 RACING THE GRAND VIEW FROM PUT-IN

FIG. 148 THE GRAND RIVER AT MAIN STREET BRIDGE, CAMBRIDGE



GUIDING THE GRAND
A CONCLUSION

Conclusion

When I chose the Grand River for the subject of this thesis work, I thought I understood a few things about it. I had already spent eight semesters studying inside of a refurbished Grand River mill, wondering how and where it ever made contact with the river. I had walked numerous times along the Living Levee in Cambridge, speculating on how it might protect the city from flooding. I had appreciated the thoughtful activation of the Mill Race Park, and wondered if other sites like it existed along the river to be explored. Still, only a few times did I ever near the river enough to touch it, and never once did I think to get into it. It is not difficult to admit that I made this thesis for people exactly like myself; people who think and act passively toward the river. It is designed for anyone willing to educate themselves about the Grand River, and to nourish a relationship with it through personal experience.

Architecture plays the role of a catalyst in this work. The traditional four-walls-and-a-roof does not factor into this design approach because of the dynamic, and often destructive, nature of the river. Anything constructed in the river will eventually erode away in its relentless currents. While material longevity and water level fluctuations do not play a role in the work of this thesis, both would be important in future iterations of the concepts that are explored. In this work, the landscape and river are the centrepieces to all design, and architecture is employed to reveal the unique aspects of history inherent to a given site. Floating buoys reinvent the banks of the Grand River as it travelled before the construction of a dam, its original path preserved below the reservoir waters. The introduction of simple pedestrian bridges makes an entire series of previously deserted river islets accessible, allowing people to experience the diversity of Grand River foliage. Gently sloping mounds rise over a swimming hole, fishing area and protected habitat creating elevational variety and unique views, and recalling the gravel storage piles of its recent industrial past. The particular angle of stairs integrated into a trail guide focus to the otherwise invisible convergence of two rivers, nodding to the merging of many cultures at one site. Finally, a re-enacted mill race opens an offshoot of the river through a once derelict eighteenth century stone mill, envisioned as a glorified camping location for Grand River heritage enthusiasts. The architecture of *Guiding the Grand* is subtle, and works to incite greater activity at the site of the river.

Designing for a riverine environment has meant thinking about the river's occupation of the space as well as peoples'. Accommodation for the different conditions of the Grand River and, ultimately, allotting the river space to live in is hugely important to the success of any development. The Dutch concept of 'Living with Water' is discussed in *River Design* in the chapter *Guiding the Grand: An Overview*, proposing a method of water management where human interventions respect the spaces that water occupies naturally and intermittently. The idea of 'Living with Water' allows for the natural and varied conditions of a major waterbody understanding that it needs to flood and normalize to the external forces acting on it. This method is employed in all designs of this thesis, effectively living with the water as opposed to against it.

The research and design in this work takes the form of a guidebook for the reasons of reaching a broad public audience, providing simple organization of analytical information, and assembling a unique and architecturally curated and contemporary guide to the Grand River. The approach of this work goes beyond that of a typical guide to the Grand River, in that it creates a perceptible connection between the past histories and the contemporary conditions of their environments. It organizes five chapters based on a day's journey as travelled down the Grand River, and cross-

references the historic identities of the river and its peoples to the recognized heritage moments along each route.

The format of a guidebook directly informs the physical composition of this thesis. It is half the size of a letter-sized piece of paper, made easy for storing. Detailed information is presented on fold-out pages, so that general information can be understood at a glance. Its pages are loosely bound with operable fasteners, so that only the essential pages can be brought on any particular trip. It is printed on durable material, to withstand the weathering from the river and its environments. The form itself encourages the intention of the work, and that is, to get into the river.

The scope of this work has been limited for the completion of an architectural thesis. The information contained in the guidebook has been selected from vast collections of information recorded on the Grand River, and made succinct in order to present five unique characteristics of its histories. The selections of information cannot represent all aspects of the Grand River, but rather create precedents to build on. Theoretically, a holistic guidebook on the paddling the Grand River would include the remainder north of Belwood Lake Conservation Area and would continue down south of Glen Morris through Paris, Brantford and Dunnvile right through to Lake Erie. The section explored in this thesis was chosen for its urban intensity and rich natural and cultural histories, rivalled only by the remaining stretches of the river to the south. The open-ended the future of this work implies that learning about the river and its histories is an ongoing endeavour, as dynamic as the river itself.

The GRCA does not currently support a widespread strategy for comprehending the river as one, continuous system, but rather the relationships between parts of a system. The strategy employed in this thesis, of creating a recurring series of spaces that relate to their surroundings with a consistent materiality and design language across them, speaks to this need. This work uses architectural elements to connect places separated by kilometres of river by a common goal.

The work conducted in this thesis supports the idea of a fundamental need for interdisciplinary approach to water management and design. Any generalized understanding that has been presented here could be further addressed with contributions from specialized professionals committed to water management, like those in the Collaborative Water Program at the University of Waterloo. An interdisciplinary approach to this work would create a richer, more informed guidebook, and greatly improve understanding for its readers.

Every year, new developments are proposed and constructed on the banks of the Grand River, introducing or altering aspects of its natural and cultural heritage. It is argued in this work, as well as in the ongoing efforts of the Grand River Conservation Authority in partnership with municipal governments, that these changes should be conducted with great awareness to avoid any adverse effects to the river or its environments, and as a part of their plan, work to improve relationships with the populations who interact with them. Future developments on the river should go beyond the legislated base minimum for interaction and adaptation, but rather seek a more fundamental bridging of our everyday relationship with the river and the rich complexities of its identity.

Endnotes

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Appendix: Modelling the Grand

For the presentation of the architectural thesis titled Guiding the Grand: Journeying into the Grand River's Diverse Histories*, it was important to include a representation of the Grand River and its landscape. The size of the site extents, approximately 80km from start to finish, meant a sizable model for any scale with enough detail to read from. The following describes the decision making for the scale, method of construction, materials of the model, as well as the presentation and additional site models that are paired with it,*

SCALE– I arrived at 1 to 10,000 early on, because the scale would permit a working grid of standard tabloid-sized sheets (11 by 17 inches) to print off and test, while retaining enough detail to discern a variable cross-sectional width of the river throughout. The full scale of the site ended up amounting to 52 sheets, later reduced to 45 sheets when one of the design sites was dropped from the project.

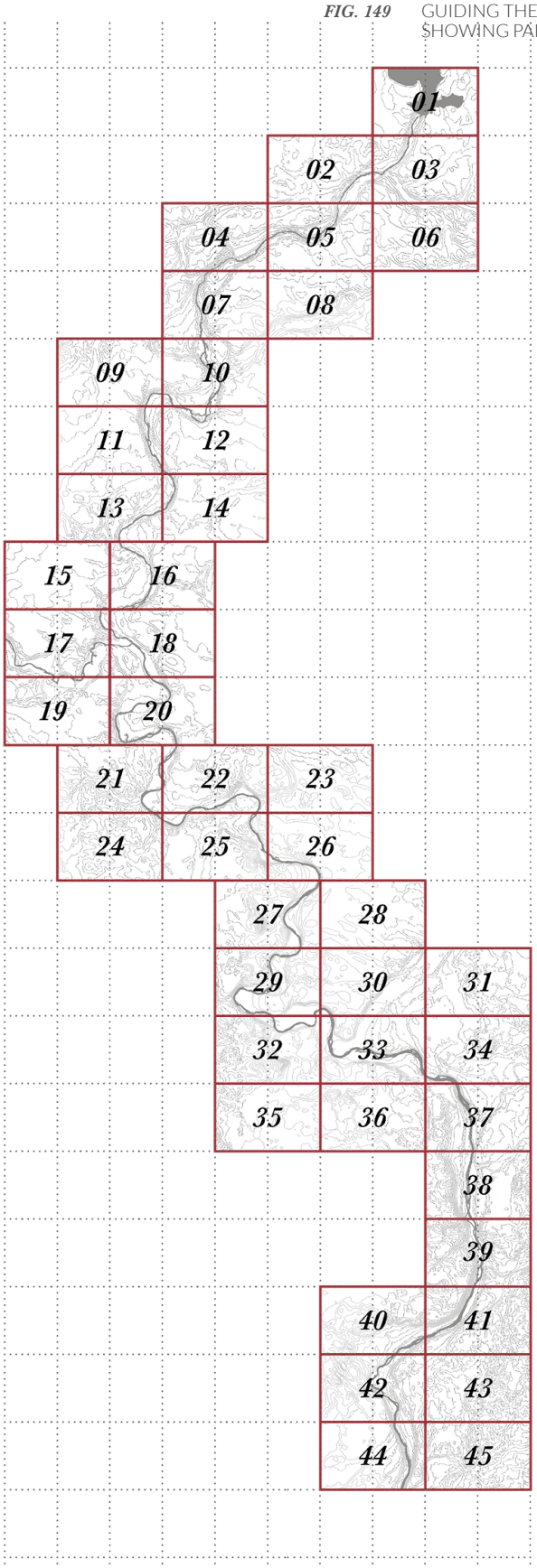
METHOD – In order to create a model 6m long by 2m wide, it was important to consider the various methods to choose from, and the time and expense that each one might mean. For Guiding the Grand, the model needed to represent the river and its terrain with enough detail to be able to recognize land features, including land forms, roadways, and the river itself. The only available methods that would require a relatively reasonable amount of time to complete the model were laser cutting and CNC routing, and the latter was chosen for reasons of automation and precision. Once uploaded, the CNC router will work to produce a piece in its entirety.

The limitations of computer numerical control, or CNC, router can all trace back to the time it takes to machine a particular piece. The precision of representation of elements with sharp edges, the size of the piece, the variance in cutting height, and the materiality can mean exponential increases in the time it takes to complete.

MATERIAL – The options to choose from with working on the University of Waterloo School of Architecture's CNC router are limited to wood and foam. Wood would mean an exponential time increase for machining, and so I opted to form. Specifically, white polystyrene foam was chosen as the material for this model, for its low cost, its variety in depth and its attractive finished texture. Other forms of foam come in different colours, that would eventually need finishing with a coat of paint.

PROJECTION MAPPING – In order to add the dimension of variable information to the model, I worked with mapping projections onto the model. These projections would change depending on the subject of my thesis discussion, showing information relating to the locations of heritage information, transportation routes, and the specific locations of each of the themed sites from the guidebook itself.

FIG. 149 GUIDING THE GRAND MODEL KEY, SHOWING PARTS 1 THROUGH 45



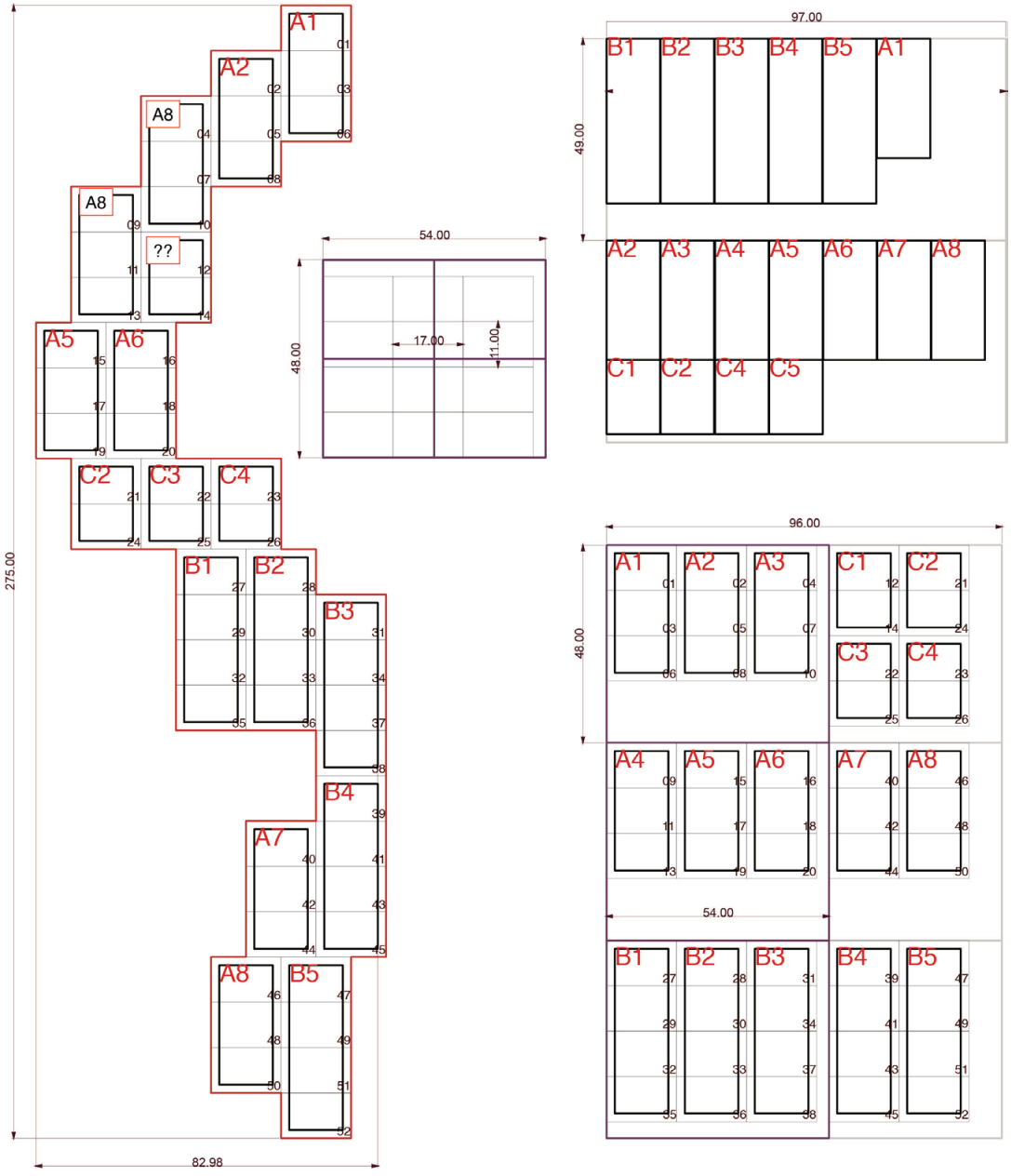


FIG. 150 GUIDING THE GRAND MODEL MATERIALS COORDINATION AND ORGANIZATION DIAGRAM, FOR ORIGINAL 52 PIECES

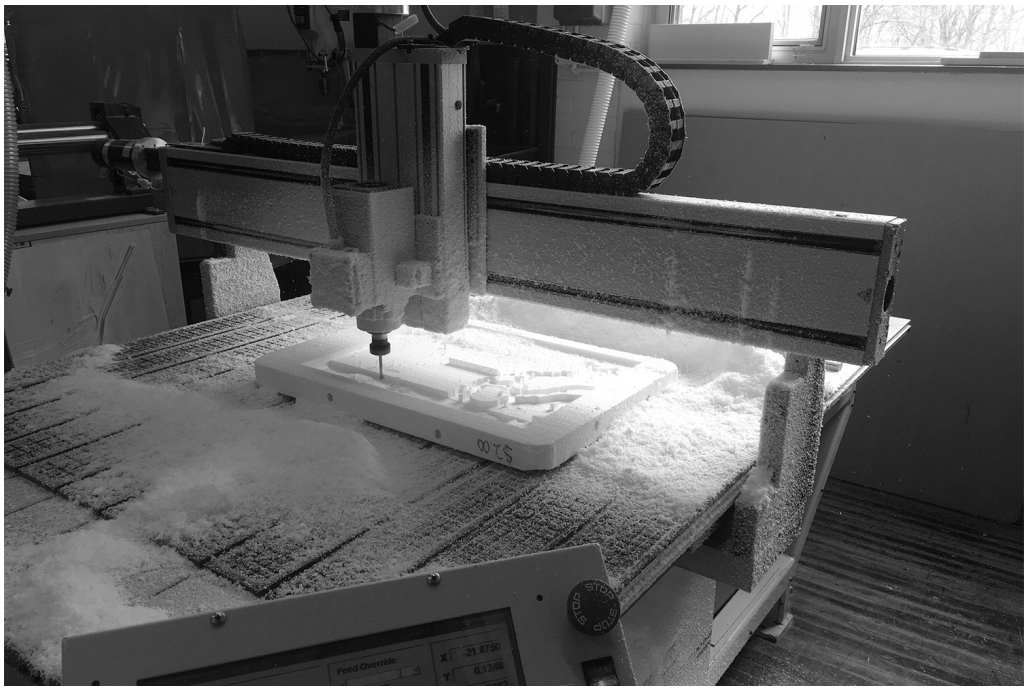


FIG. 151 CNC ROUTING PIECES FOR GUIDING THE GRAND MODEL

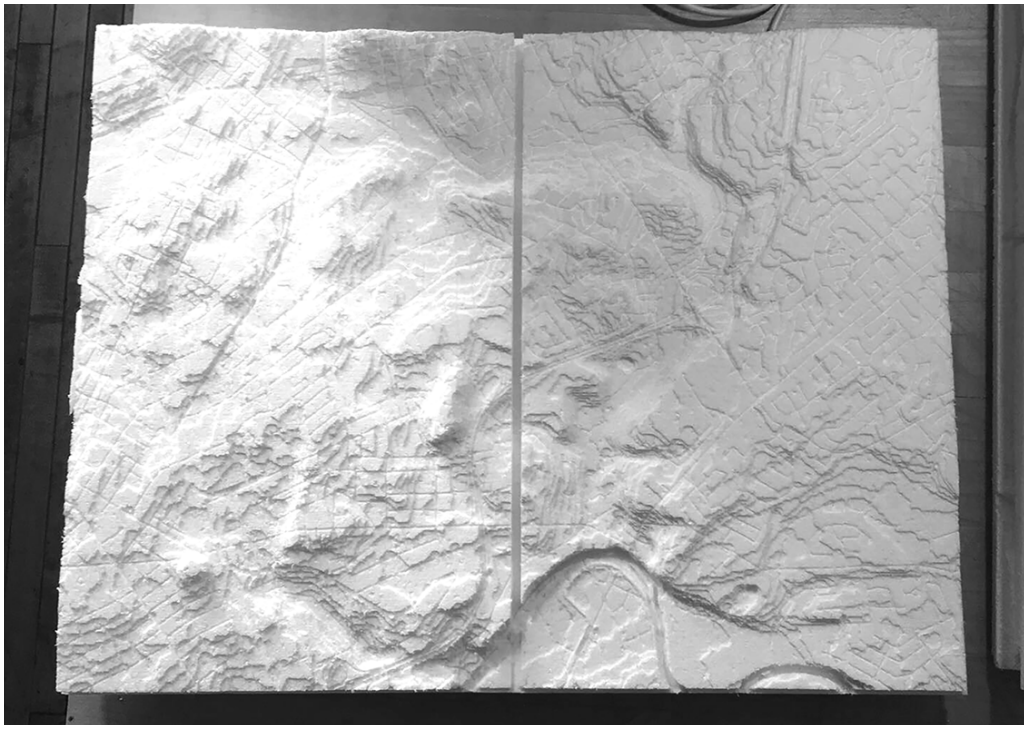


FIG. 152 COMPELTED PIECE FOR GUIDING THE GRAND MODEL

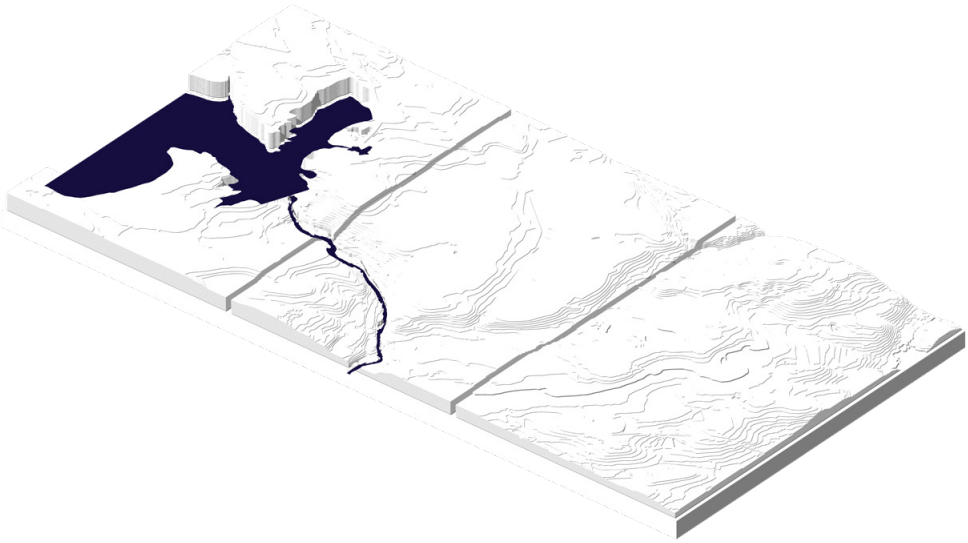


FIG. 153 DETAIL OF 3 OF 45 PIECES FROM THE GUIDING THE GRAND MODEL

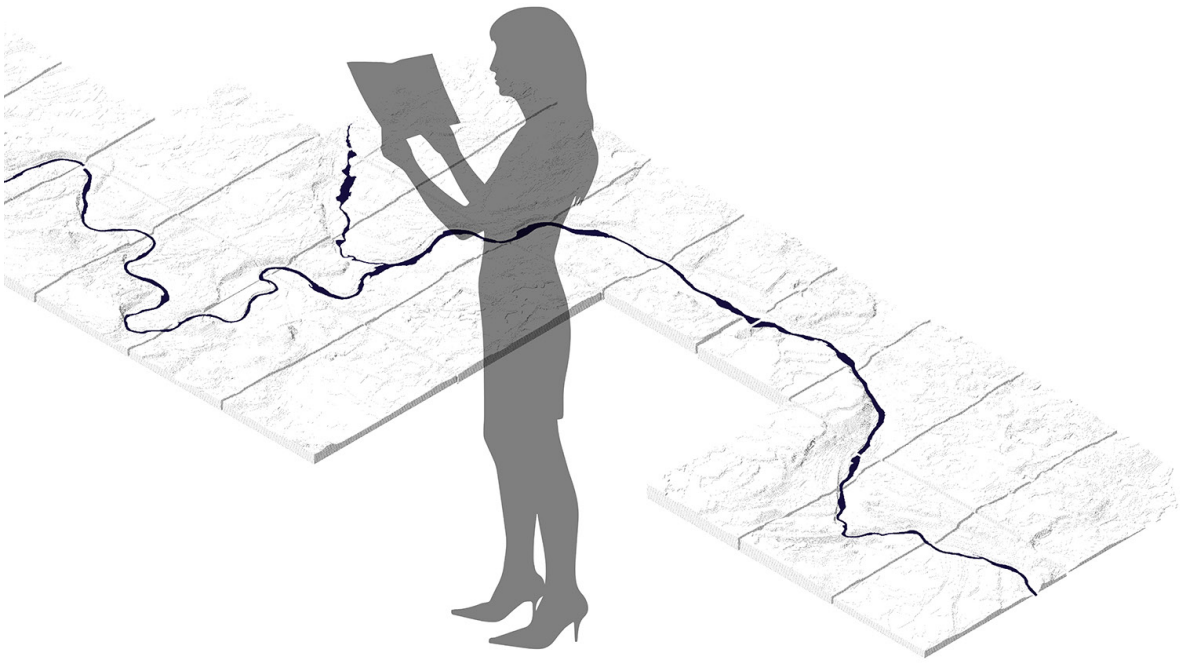


FIG. 154 GUIDING THE GRAND FULL SCALE MODEL AXONOMETRIC WITH SCALED FIGURES

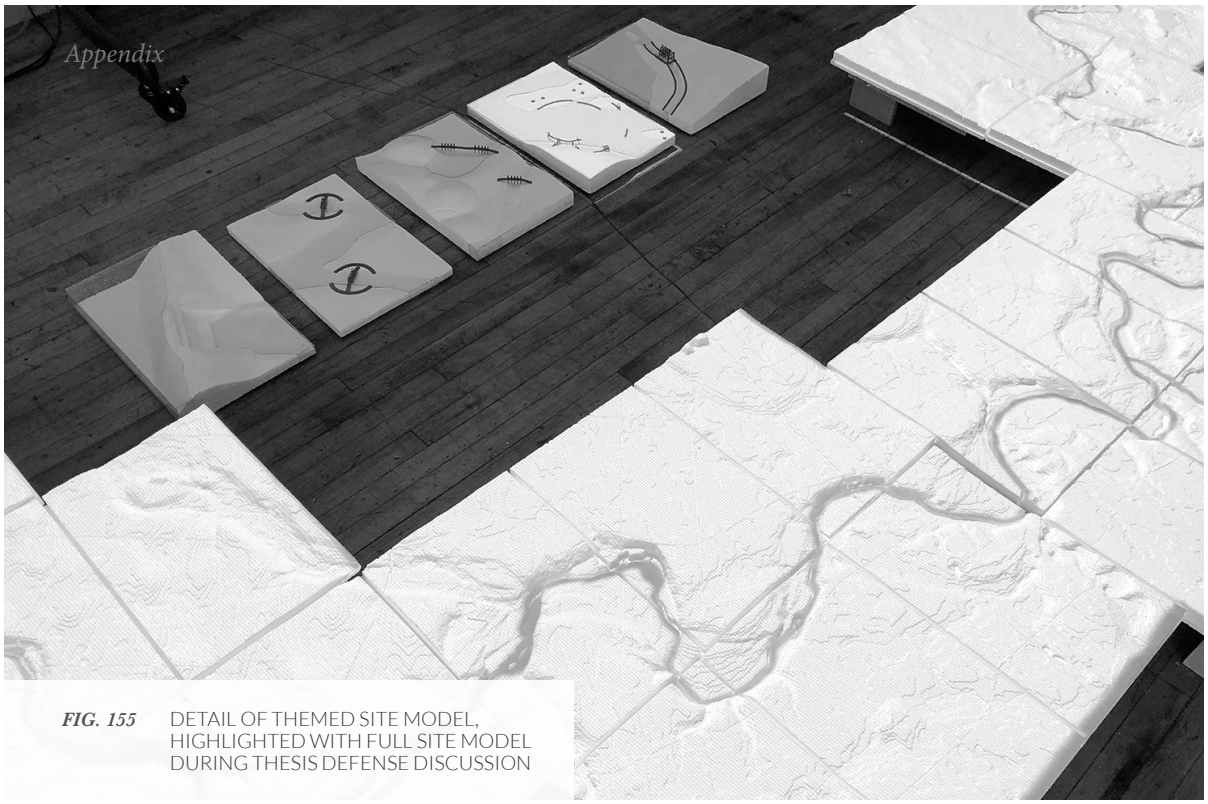


FIG. 155 DETAIL OF THEMED SITE MODEL, HIGHLIGHTED WITH FULL SITE MODEL DURING THESIS DEFENSE DISCUSSION

FIG. 156 GUIDING THE GRAND THEMED SITE MODELS: FROM TOP TO BOTTOM, RACING, GATHERING, RESTORING, UNEARTHING AND DISPLACING THE GRAND

SUPPORTING SITE MODELS – Five additional tabloid-sheet-sized models, each at a scale of 1 to 500, were produced along with the larger model in order to reference the designed proposed at each of the five themed sites within the guidebook.

PRESENTATION – I decidedly early on that I wanted the model to sprawl across the floor in its presentation, so that a person attending my defense could travel the river and its landscape with me as I guided them through my presentation. The final presentation required that a short-throw projector be mounted to the ceiling, so that it could project images onto the floor. With this, and a screen to show specific excerpts from the guidebook itself, *Guiding the Grand* was presented.

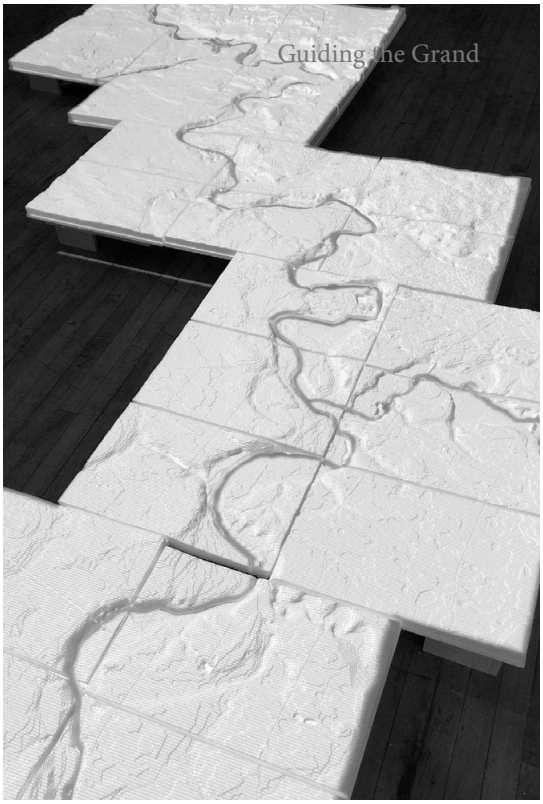


FIG. 157 DETAIL OF GUIDING THE GRAND FULL SITE MODEL

FIG. 158 PRESENTATION SET-UP FOR THESIS PRESENTATION OF GUIDING THE GRAND

Index A: Grand River Resources

Conservation Resources

Conservation Ontario
120 Bayview Parkway
Newmarket, ON L3Y 3W3
Phone: 905-895-0716
Fax: 905-895-0751
Email: info@conservationontario.ca

Grand River Conservation Authority
400 Clyde Road, PO Box 729
Cambridge, ON N1R 5W6
Phone: 519-621-2761
Toll free: 1-866-900-4722
Email: grca@grandriver.ca

Grand River Conservation Foundation
Grand River Conservation Authority
400 Clyde Road PO Box 729
Cambridge, ON N1R 5W6
Phone: 519-621-2763 x2272

Ministry of Natural Resources and Forestry
Whitney Block 6th Flr Rm
6630, 99 Wellesley St W
Toronto, ON M7A 1W3
Phone: 416-314-2301

Natural Resources Information and Support Centre (NRISC)
300 Water Street
Peterborough, ON K9J 8M5

Conservation Area Resources

Belwood Lake Park
8282 Wellington County Rd. 18, RR #2
Fergus, ON N1M 2W5
Phone: 519-843-2979

Elora Gorge Park
7400 Wellington County Rd. 21, Box 356
Elora, ON N0B 1S0
Phone: 519-846-9742

Elora Quarry Park
319 Wellington County Rd. 18, Box 356
Elora, ON N0B 1S0
Phone: 519-846-5234

Paddling Outfitter Resources

Brant Waterways Foundation
P.O. Box 21014, 84 Lynden Road
Brantford, ON N3R 6B8
Phone: 519-770-6000
Email: info@brantwaterways.ca

Canoeing the Grand
3734 King Street East
Kitchener, ON N2P 2G5
Phone: (519) 896-0290
Toll free: 1-877-896-0290

Grand River Experiences
113 Grand River Street North
Paris, ON N3L 2M4
Phone: 519-442-3654
Toll Free: 1-888-258-0441

Grand River Kayak
2 Port Maitland Road
Dunnville, ON N1A 1Y3
Toll Free: 1-888-529-2515

Grand River Rafting &
Heritage River Canoe & Kayak
51 William St,
Paris, ON N3L 1L2
Phone: 519-442-2519
Email: info@grandriverrafting.ca

Tourism Resources

Explore Waterloo Region
Fax: 1.519.585.7893
151 Charles Street West, Suite 100
Kitchener, ON N2G 1H6
Phone: 1.519.585.7517
Toll-Free: 1.877.585.7517

Cambridge Centre Tourism
355 Hespeler Road
Cambridge, ON N1R 6B3
Phone: 519-624-9415

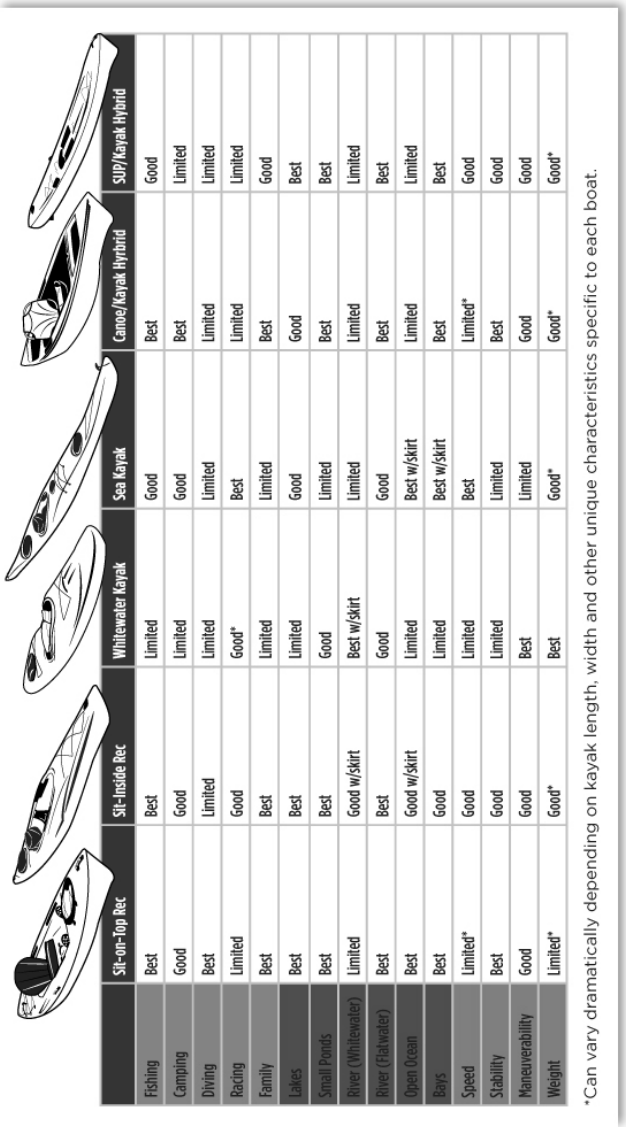
Centre Wellington, Civic Centre (Township Offices)
1 Macdonald Square
Elora, ON N0B 1S0
Phone: 519.846.9691 x901

Ministry of Culture
Hearst Block 9th Flr, 900 Bay St
Toronto, ON M7E 2A1
Phone: 416-326-9326
Toll free: 1-800-668-2746

Six Nations of the Grand River
2498 Chiefswood Road, P.O.Box 569
Ohsweken, ON N0A 1M0
Phone: 519.758.5444
Toll Free: 1.866.393.3001

Index B: Paddling Informational Charts

TABLE 1 AMERICAN KAYAKING ASSOCIATION'S DIFFERENT TYPES OF KAYAK.



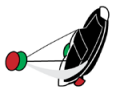
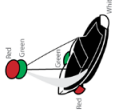
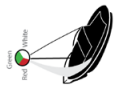
	Sit-on-Top Rec	Sit-Inside Rec	Whitewater Kayak	Sea Kayak	Canoe/Kayak Hybrid	SUP/Kayak Hybrid
Fishing	Best	Best	Limited	Good	Best	Good
Camping	Good	Good	Limited	Good	Best	Limited
Diving	Best	Limited	Limited	Limited	Limited	Limited
Racing	Limited	Good	Good*	Best	Limited	Limited
Family	Best	Best	Limited	Limited	Best	Good
Lakes	Best	Best	Limited	Good	Good	Best
Small Ponds	Best	Best	Good	Limited	Best	Best
River (Whitewater)	Limited	Good w/skirt	Best w/skirt	Limited	Limited	Limited
River (Flatwater)	Best	Best	Good	Good	Best	Best
Open Ocean	Best	Good w/skirt	Limited	Best w/skirt	Limited	Limited
Bays	Best	Good	Limited	Best w/skirt	Best	Best
Speed	Limited*	Good	Limited	Best	Limited*	Good
Stability	Best	Good	Limited	Limited	Best	Good
Maneuverability	Good	Good	Best	Limited	Good	Good
Weight	Limited*	Good*	Best	Good*	Good*	Good*

*Can vary dramatically depending on kayak length, width and other unique characteristics specific to each boat.

SOURCE American Kayaking Association. "Different Types of Kayaks." Digital image. AKA. 2018. http://www.americankayak.org/different-types-of-kayaks/.

TABLE 2 BASED ON TRANSPORT CANADA'S SAFE BOATING GUIDE "MINIMUM SAFETY EQUIPMENT REQUIREMENTS BY BOAT TYPE AND LENGTH".

NAVIGATION LIGHT AND SHAPE REQUIREMENTS BY BOAT TYPE AND LENGTH

BOAT TYPE AND LENGTH	REQUIREMENTS	
• Sail Boats under 7 m (23') - Rule 25 NOTE: In the Canadian waters of a roadstead (mooring area), harbour, river, lake or inland waterway, a sail boat under 7 m that is also being propelled by a motor is not required to exhibit forward a conical shape (point downwards) where it can best be seen.	Option 1 -Sidelights; and -One (1) sternlight	
	Option 2 -Sidelights; -One (1) sternlight; and -Two (2) all-round lights in a vertical line, the upper being red and the lower green	
	Option 3 -One (1) lantern, combining the sidelights and sternlight above	
	Option 4 (if other options are not practicable) -An electric torch or lighted lantern showing a white light (a watertight flashlight is acceptable) that you must use far enough in advance to prevent a collision	
• Sail Boats from 7m (23') to under 20m (65'7") - Rule 25 NOTE: In the Canadian waters of a roadstead (mooring area), harbour, river, lake or inland waterway, a sail boat under 12 m that is also being propelled by a motor is not required to exhibit forward a conical shape (point downwards) where it can best be seen.	Option 1 -Sidelights; and -One (1) sternlight	
	Option 2 -Sidelights; -One (1) sternlight; and -Two (2) all-round lights in a vertical line, the upper being red and the lower green	
	Option 3 -One (1) lantern, combining the sidelights and sternlight above	
• Human-Powered Boats - Rule 25	Option 1 -An electric torch or lighted lantern showing a white light (a watertight flashlight is acceptable) ready to use far enough in advance to prevent a collision	
	Option 2 -Same lights as listed for sail boats, according to length	

SOURCE Transport Canada, "Safe Boating Guide," Transport Canada, June 13, 2018, 16-17, accessed March 18, 2018, http://www.tc.gc.ca/eng/marinesafety/debs-obs-menu-1362.htm.

TABLE 3 TRANSPORT CANADA'S SAFE BOATING GUIDE PRE-DEPARTURE CHECKLIST.

PRE-DEPARTURE CHECKLIST

Be prepared for the unexpected. Check this list before every trip.

- Lifejackets and PFDs – Wear Them!
  - Carry a Canadian-approved lifejacket or PFD of the proper size, for each person on board.
  - Make sure they are in good condition (check the zippers, buckles, fabric, seams, etc.).
- Operator Competency – Are You Ready to Head Out on the Water?
  - Take a boating safety course.
  - Always carry your Pleasure Craft Operator Card or other proof of competency on board.
- Weather – Check and Monitor the Marine Weather Forecast
- Sail Plan – File Your Plan Before Heading Out
  - Use the sample sail plan in this guide.
  - Tell a person you trust where you are going and when you will be back.
- Safety Equipment – Required by Law and Essential for Safety
  - See equipment required for your boat.
  - Make sure all equipment is on board, in good working order and easy to reach.
  - Carry a first aid kit, basic tools and spare parts.
- Charts, Compass and Local Hazards – Know Where You Are at All Times
  - Make sure you are aware of all local hazards, water levels and tides.
- Fuel – Check Your Tank and Remember:
  - 1/3 to go, 1/3 to return, 1/3 reserve .
- Boat Condition – Should Your Boat Leave the Dock?
  - Check the hull for cracks or other damage.
  - Check the electrical, fuel, propulsion and cooling systems.
  - Make sure the throttle and steering work well.
  - Check the oil.
  - Check all hoses and lines for leaks or cracks, and replace if necessary.
  - Make sure all clamps and belts are secure and in good shape.
  - Inspect, clean and replace spark plugs if necessary.
  - Check and change oil and water filters if needed.
  - Check the battery's charge.
  - Make sure the drainage plug is in place.
  - Carry spare plugs for all through hull fittings.
  - Make sure the load on your boat (gear and people) is well distributed.
  - Run the blowers for four minutes before starting the engine(s) and check for airflow.
- Safety Briefing – You Are Legally Responsible for Your Guests
  - Show everyone where you keep the safety equipment and explain how to use it.
  - Make sure the communication equipment works and everyone knows how to use it.

SOURCE Transport Canada, "Safe Boating Guide," Transport Canada, June 13, 2018, 72, accessed March 18, 2018, http://www.tc.gc.ca/eng/marinesafety/debs-obs-menu-1362.htm.

TABLE 4 TRANSPORT CANADA'S SAFE BOATING GUIDE PRE-DEPARTURE CHECKLIST.

SAIL PLAN

To make filing your sail plan easy, photocopy this card and fill in the blanks.

OWNER INFORMATION					
Name:					
Address:					
Telephone Number:			Emergency Contact Number:		
BOAT INFORMATION					
Boat Name:			Licence or Registration Number:		
Sail:	Power:		Length:	Type:	
Colour	Hull:		Deck:	Cabin:	
Engine Type:			Distinguishing Features:		
Radio Channels Monitored:	HF:		VHF:	MF:	
MMSI (Marine Mobile Service Identity) Number:					
Satellite or Cellular Telephone Number:					
SAFETY EQUIPMENT ON BOARD					
Lifejackets and PFDs (include number):					
Liferafts (include type and colour):					
Flares (include number and type):					
Other Safety Equipment:					
TRIP DETAILS (UPDATE THESE DETAILS EVERY TRIP)					
Number of People on Board:			Search and Rescue Telephone Number:		
Proposed Route					
Leaving From:			Date and Time of Departure:		
Heading To:			Estimated Date and Time of Arrival:		
Stopover Points (indicate date and time):					

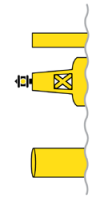
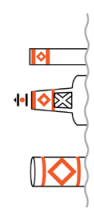
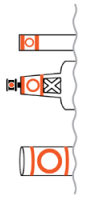
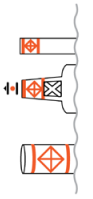
SOURCE Transport Canada, "Safe Boating Guide," Transport Canada, June 13, 2018, 73, accessed March 18, 2018, http://www.tc.gc.ca/eng/marinesafety/debs-obs-menu-1362.htm.

TABLE 5 TRANSPORT CANADA'S SAFE BOATING GUIDE "SPECIAL BUOYS".

SPECIAL BUOYS

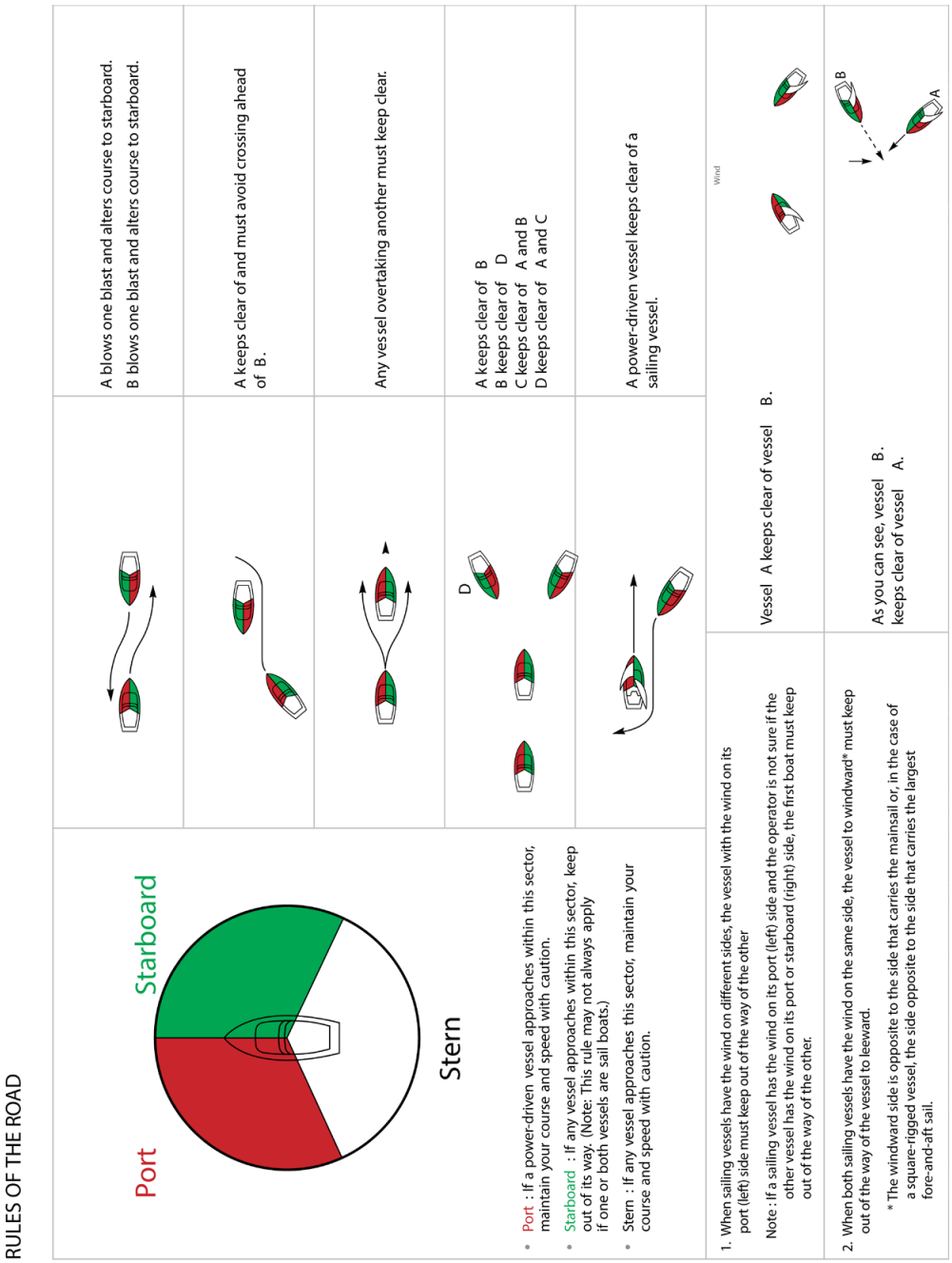
Description

- Shapes have no special meaning
- May be lettered – no numbers
- Cautionary, scientific and anchorage buoys may display a yellow "X" topmark
- Yellow lights – flash characters (if equipped)
- Yellow retroreflective material

					
Cautionary A cautionary buoy marks dangers such as firing ranges, underwater pipelines, race courses, seaplane bases and areas where no through channel exists.	**Anchorage** An anchorage buoy marks the outer limits of designated anchorage areas. Consult the chart for water depth.	**Mooring** A mooring buoy is used for mooring or securing vessels. Be aware that when you see one, there may be a vessel secured to it.	**Information** An information buoy displays information such as locality, marina, campsite, etc. inside the orange square .	**Hazard** A hazard buoy marks random hazards such as shoals and rocks. You will find information illustrated inside the orange diamond.	
					
Control Obey the speed limits, wash restrictions, etc. are illustrated inside the orange circle .	**Keep out** A keep out buoy marks areas your vessel may not enter.	**Scientific (ODAS)** An ocean data acquisition system buoy collects weather and other scientific data.	**Diving** A diving buoy marks an area where scuba or other such diving activity is in progress . You are not likely to find them on navigation charts.	**Swimming** A swimming buoy marks the outer limits of swimming areas. It may not appear on your navigation charts.	

SOURCE Transport Canada, "Safe Boating Guide," Transport Canada, June 13, 2018, 76, accessed March 18, 2018, http://www.tc.gc.ca/eng/marinesafety/debs-obs-menu-1362.htm.

TABLE 6 TRANSPORT CANADA'S SAFE BOATING GUIDE "RULES OF THE ROAD".



SOURCE Transport Canada, "Safe Boating Guide," Transport Canada, June 13, 2018, 77, accessed March 18, 2018, http://www.tc.gc.ca/eng/marinesafety/debs-obs-menu-1362.htm.